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Testing Laboratory accredited by the Swiss Accreditation Service

Akkreditierungs-Nr.
No. d'accréditation STS 0499
Accreditation No.

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Multilateral Agreement for the recognition of test certificates

Prüfnummer
No. d'essai LW-696-25-02
Test No. Version 1

Prüfzertifikat - Luft/Wasser-Wärmepumpe Certificat d'essai - Pompes à chaleur air-eau Test certificate - Air to water heat pump

| | | | |
|--------------|-----------------------------|-------------------------|------------------------------------|
| Auftraggeber | Refsystem Sp. z o.o. | Datum der Prüfung | |
| Client | ul. Metalowców 5 | Date du test | 13.01.2025 - 27.01.2025 |
| Customer | PL - 86-300 Grudziądz | Date of test | |
| Gerät | Haier | Bauart | Wärmepumpe für Aussenaufstellung |
| Type | Haier AU162FYCRA(HW) | Type de construction | machine pour pose extérieur |
| Type | SN: AA2JT 3E290 0AUNA H0130 | Type of construction | heat pump for outdoor installation |
| Kältemittel | | Kältemittelfüllmenge | |
| Réfrigérant | R32 GWP(100) = 675 | Quantité de réfrigérant | 2.6 kg |
| Refrigerant | | Capacity of refrigerant | |

Prüfung wurde gemäss den folgenden Normen durchgeführt
Mesures exécutées conformément aux normes
Measurements according to the following standards

EN 14511:2022 and EN 14825:2022
EN 12102-1:2022 and EN ISO 9614-1:2010
-

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Messresultate und Messunsicherheiten sind auf der folgenden Seite aufgeführt und sind Teil des Zertifikates.
Les résultats et les incertitudes de mesure sont donnés aux page suivante et font partie du certificat.
This measurements, the uncertainties are given on the following page and are part of the certificate.

Stempel und Datum
Timbre et date
Stamp and date

WPZ
Wärmepumpen-Testzentrum
Hochschule f. Technik NTB
Werdenbergstrasse 4
CH - 9471 Buchs SG

29.01.2025

Messort
Site de mesure
Measuring site

Wärmepumpen-Testzentrum WPZ
Werdenbergstrasse 4
CH - 9471 Buchs (Switzerland)

Prüfer
Contrôleur
Supervisor

C. Schaible, Messtechniker

Prüfstellenleiter
Chef du Laboratoire
Head of the Laboratory

M. Eschmann, Dipl. Ing. FH

Leistungen / Performances / Performances

LW-696-25-02 / Version 1

| | Prüfbedingung Condition d'essai Test condition | Heizleistung Puis. chauff. moy. Heating capacity kW | elek. Leistung Puis. elec. moy. Input power kW | COP | Cdh | CR | T _{VL} T _{OUT} T _{OUT} °C |
|---|--|--|---|------|-------|------|---|
| 1 | A7W30-35 | 16.007 | 3.983 | 4.02 | - | - | - |
| 2 | - | - | - | - | - | - | - |
| 3 | - | - | - | - | - | - | - |
| 4 | - | - | - | - | - | - | - |
| A | A-7Wxx-34 | 13.690 | 5.111 | 2.68 | - | 1.00 | 34.0 |
| B | A2Wxx-30 | 8.216 | 2.176 | 3.78 | - | 1.00 | 30.0 |
| C | A7Wxx-27 | 5.640 | 0.940 | 6.00 | - | 1.00 | 27.0 |
| D | A12Wxx-24 | 5.813 | 0.702 | 8.28 | 0.982 | 0.42 | 25.1 |
| E | A-10Wxx-35 | 13.958 | 5.893 | 2.37 | - | 1.00 | 35.0 |
| F | A-7Wxx-34 | 13.690 | 5.111 | 2.68 | - | 1.00 | 34.0 |

| climate | average |
|-------------------------|----------------------|
| Temperature application | low (35 °C) |
| SCOP _{on} | 4.19 |
| Labeling | A++ / 164.7 % |
| Pdesignh [kW] | 16.0 |
| Q _H [kWh] | 33056.0 |
| Tbivalent [°C] | -7 |

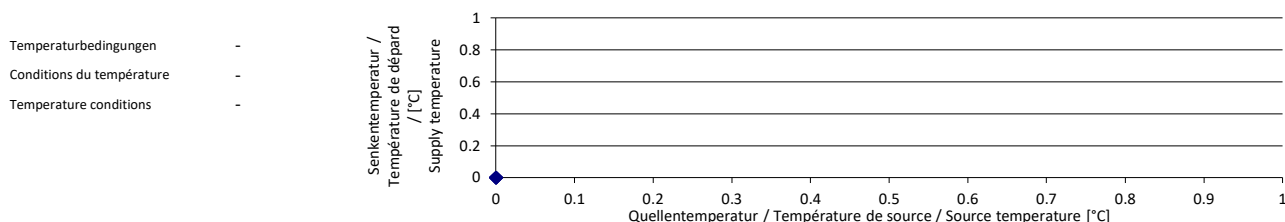
| | Prüfbedingung Condition d'essai Test condition | Heizleistung Puis. chauff. moy. Heating capacity kW | elek. Leistung Puis. elec. moy. Input power kW | COP | Cdh | CR | T _{VL} T _{OUT} T _{OUT} °C |
|-----|--|--|---|------|-------|------|---|
| 1 | A7W47-55 | 13.697 | 5.255 | 2.61 | - | - | - |
| A | A-7Wxx-52 | 12.083 | 6.560 | 1.84 | - | 1.00 | 52.0 |
| B | A2Wxx-42 | 7.316 | 2.273 | 3.22 | - | 1.00 | 42.0 |
| C | A7Wxx-36 | 5.103 | 1.149 | 4.44 | - | 1.00 | 36.0 |
| D | A12Wxx-30 | 5.457 | 0.877 | 6.23 | 0.987 | 0.39 | 31.9 |
| E | A-10Wxx-55 | 7.925 | 7.189 | 1.10 | - | 1.00 | 55.0 |
| F | A-7Wxx-52 | 12.083 | 6.560 | 1.84 | - | 1.00 | 52.0 |
| 1 | - | - | - | - | - | - | - |
| 2 | - | - | - | - | - | - | - |
| 3 | - | - | - | - | - | - | - |
| 4 | - | - | - | - | - | - | - |
| Pto | W 12.5 | Psb | W 17.2 | Pck | W - | Poff | W 17.2 |

| climate | average |
|-------------------------|----------------------|
| Temperature application | medium (55 °C) |
| SCOP _{on} | 3.25 |
| Labeling | A++ / 126.9 % |
| Pdesignh [kW] | 14.0 |
| Q _H [kWh] | 28924.0 |
| Tbivalent [°C] | -7 |

| | Prüfbedingung Condition d'essai Test condition | Kühlleistung Puis. refroid. moy. Cooling capacity kW | elek. Leistung Puis. elec. moy. Input power kW | EER |
|---|--|---|---|------|
| 1 | A35 / W23-18 | 16.18 | 3.74 | 4.33 |
| 2 | A35 / W12-7 | 14.57 | 5.20 | 2.80 |

| | | |
|--------------------------|-----------------------|--|
| Sicherheitsprüfung nach | EN 14511-4 clause 4.5 | nicht durchgeführt / n'est pas effectuée / not applied |
| Test de sécurité aux | EN 14511-4 clause 4.6 | nicht durchgeführt / n'est pas effectuée / not applied |
| Safety test according to | | |

Einsatzgrenzen / Limites d'utilisation / Operating range



Schallleistungspegel bei / Niveau de puissance acoustique au / Sound power level at A7/W47-55

| | | |
|---------------------|-------|------|
| Aussenmessung | | |
| Mesure extérieure | dB(A) | 61.9 |
| Outdoor measurement | | |

Hinweis / Remarque / Notice

Prüfbedingung
 Test condition

A7 / W30-35

 Prüfnummer
 Test number

LW-696-25-02

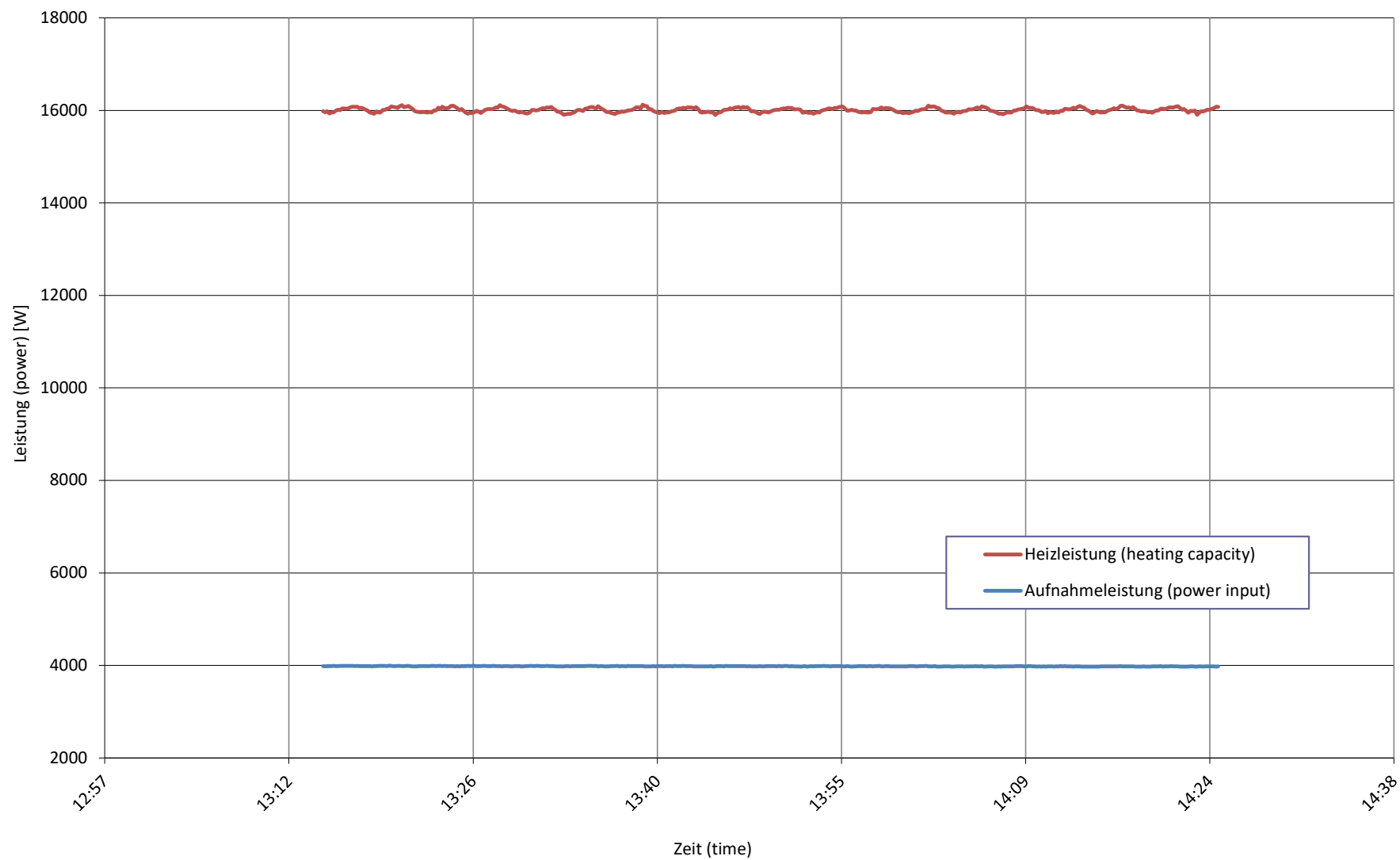
| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 16007 | ± 390 | ± 2.43% |
| a Heizleistung (heating capacity) | W | 16089 | ± 357 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 7.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | 3.19 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 87.1 | ± 3.5 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 29.99 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 35.00 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 2769.6 | ± 27.7 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -62.70 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggastemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgastemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 3983 | ± 58 | ± 1.46% |
| Wirkleistung (power input) | W | 4113 | ± 37 | |
| Spannung (voltage) | V | 230.9 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 6.05 | ± 0.04 | |
| Scheinleistung (apparent output) | VA | 4127 | ± 33 | |
| Leistungsfaktor cosp (power factor) | - | 0.996 | ± 0.001 | |
| 3 COP (COP) | - | 4.019 | ± 0.156 | ± 3.89% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 21.4 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 13:14:40 | 13.01.2025 | 2025-01-13 |
| Prüfende (end of test) | hh:mm:ss | 14:24:40 | 13.01.2025 | 2025-01-13 |

6 Bemerkung (remark)

- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 71 rps
- Ventilatorumdrehzahl / fan speed = 600 rpm (Level 8)
- LEVa = 178 pls

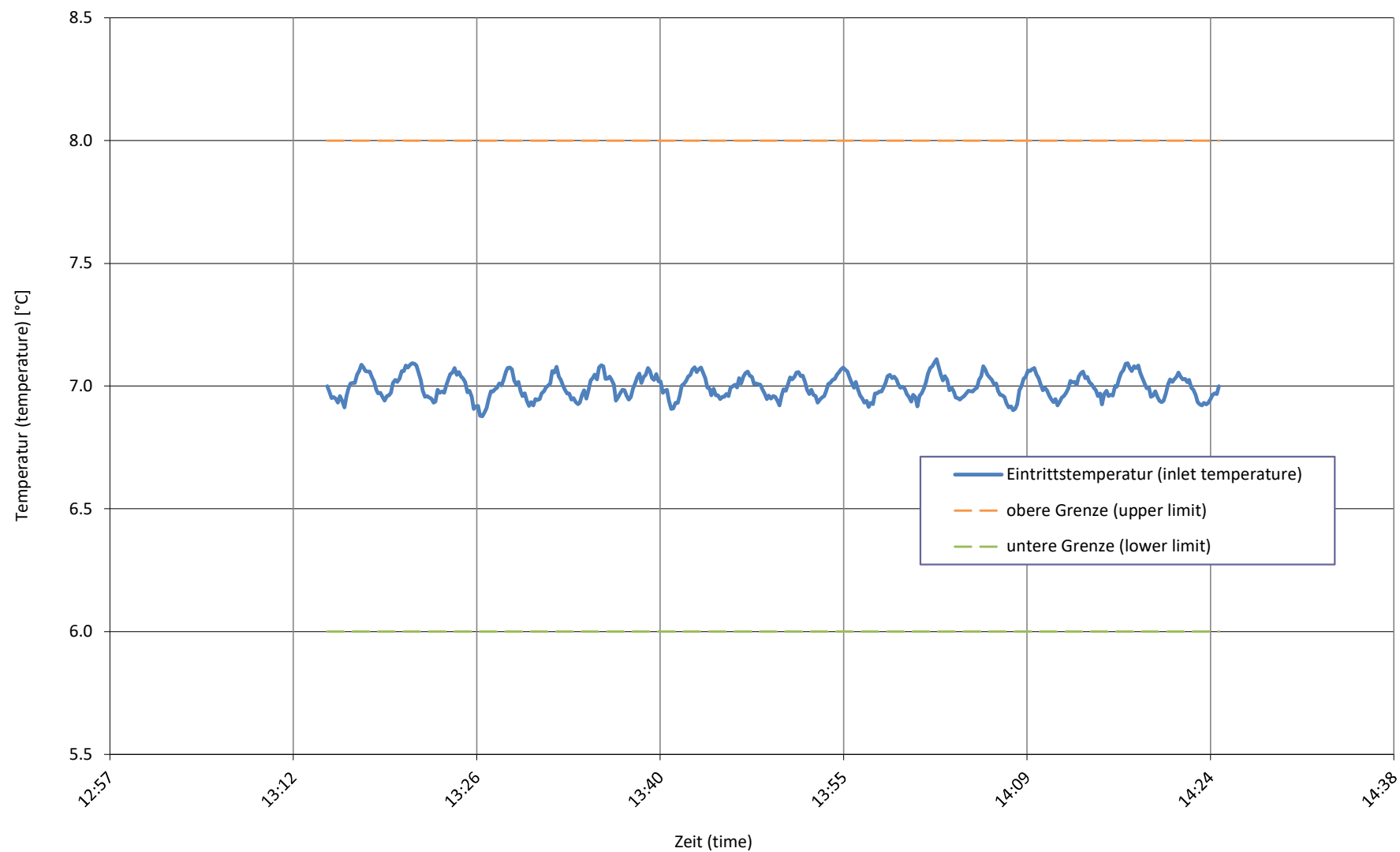
7 Prüfer (supervisor) C. Schaible**Prüfnorm** (test standard)
 EN 14511-2:2022
 EN 14511-3:2022
 EN 14825:2022

 passed
 passed
 passed

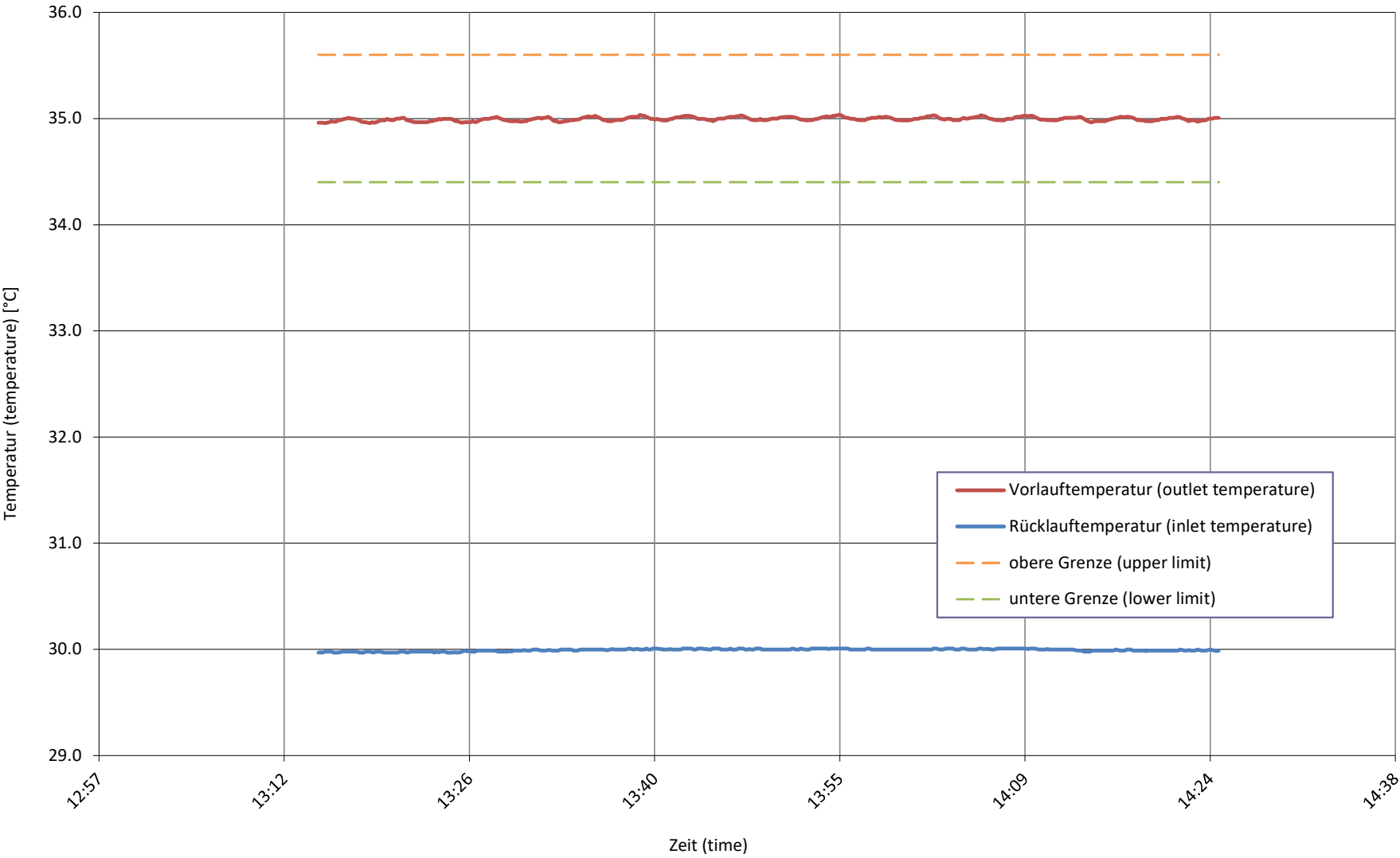
Wärme- und Aufnahmeleistung bei
heating capacity and input power at**A7 / W30-35**

Quellentemperatur bei
source temperature at

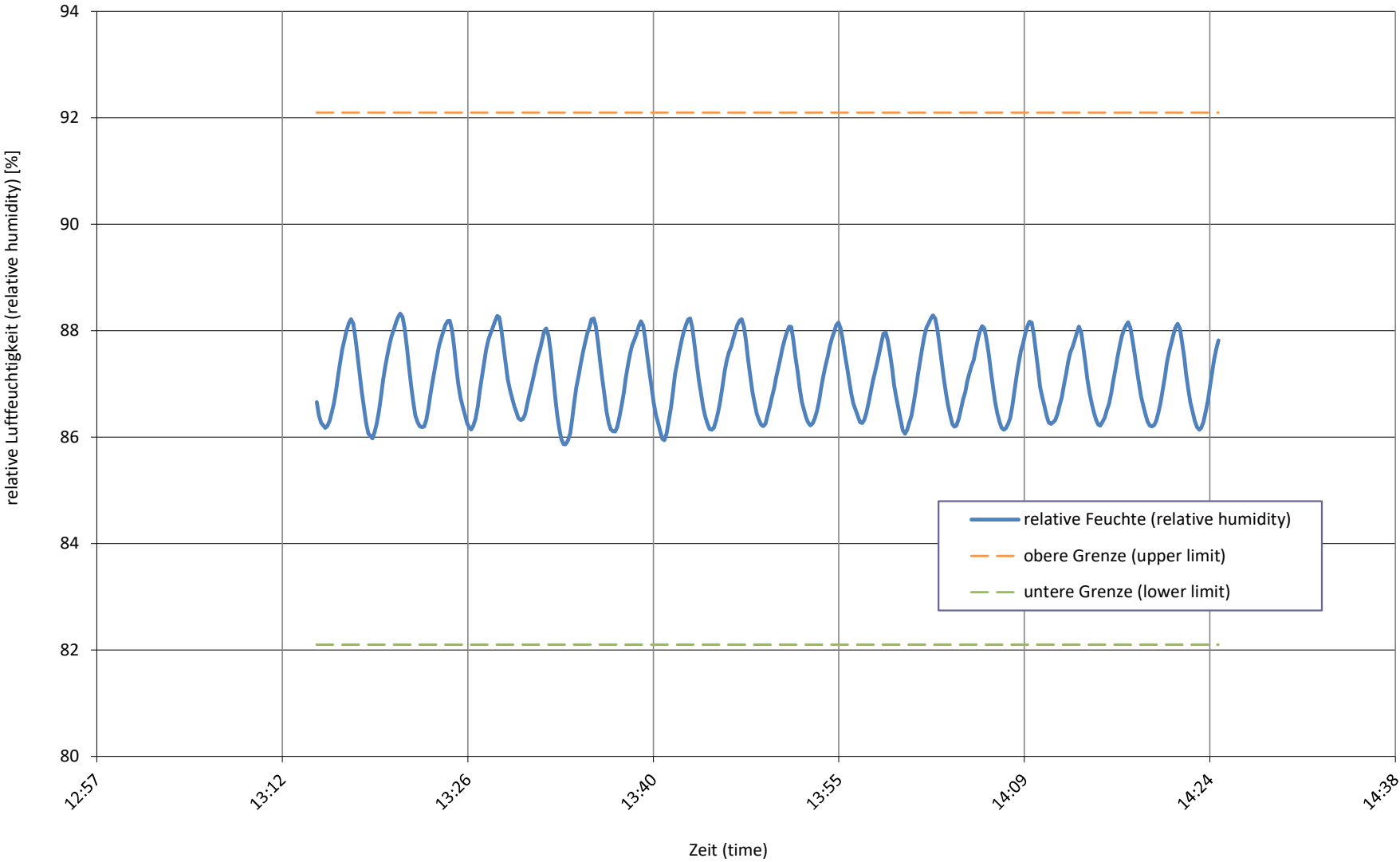
A7 / W30-35



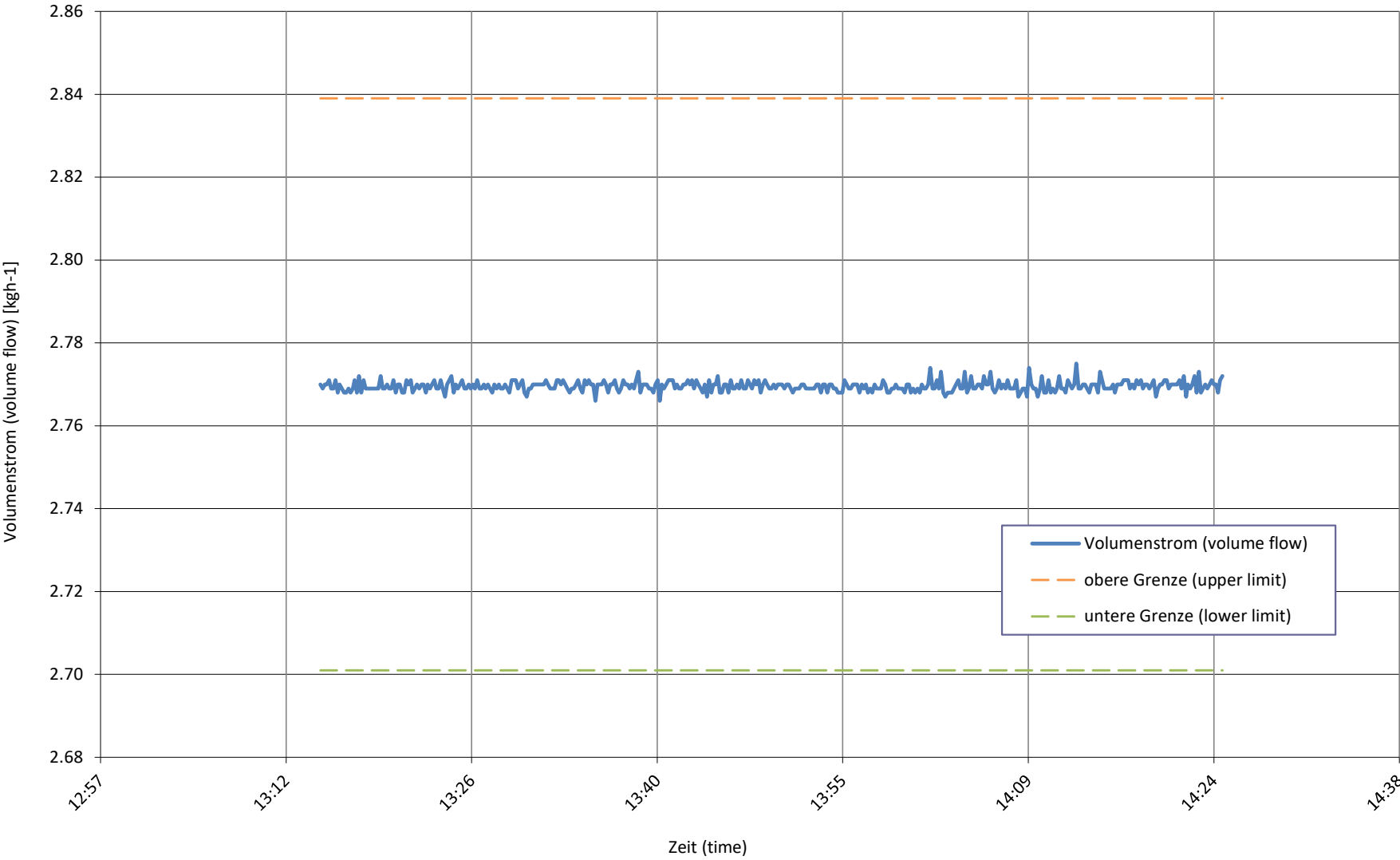
Senktemperatur bei
sink temperature at **A7 / W30-35**



relative Luftfeuchtigkeit bei
relative humidity at **A7 / W30-35**



Senkenmassenstrom bei
sink mass flow at **A7 / W30-35**



Prüfbedingung
 Test condition
A-7 / Wxx-34 Tbiv
 Prüfnummer
 Test number
LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 13690 | ± 382 | ± 2.77% |
| a Heizleistung (heating capacity) | W | 13775 | ± 347 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | -7.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | -9.99 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 69.3 | ± 2.8 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 29.71 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 33.99 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 2769.6 | ± 27.7 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -65.83 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggasttemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgasttemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 5111 | ± 69 | ± 1.35% |
| Wirkleistung (power input) | W | 5246 | ± 47 | |
| Spannung (voltage) | V | 232.1 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 7.70 | ± 0.05 | |
| Scheinleistung (apparent output) | VA | 5270 | ± 42 | |
| Leistungsfaktor cosp (power factor) | - | 0.995 | ± 0.001 | |
| 3 COP (COP) | - | 2.679 | ± 0.110 | ± 4.12% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 21.1 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 17:03:20 | 16.01.2025 | 2025-01-16 |
| Prüfende (end of test) | hh:mm:ss | 18:13:20 | 16.01.2025 | 2025-01-16 |

6 Bemerkung (remark)

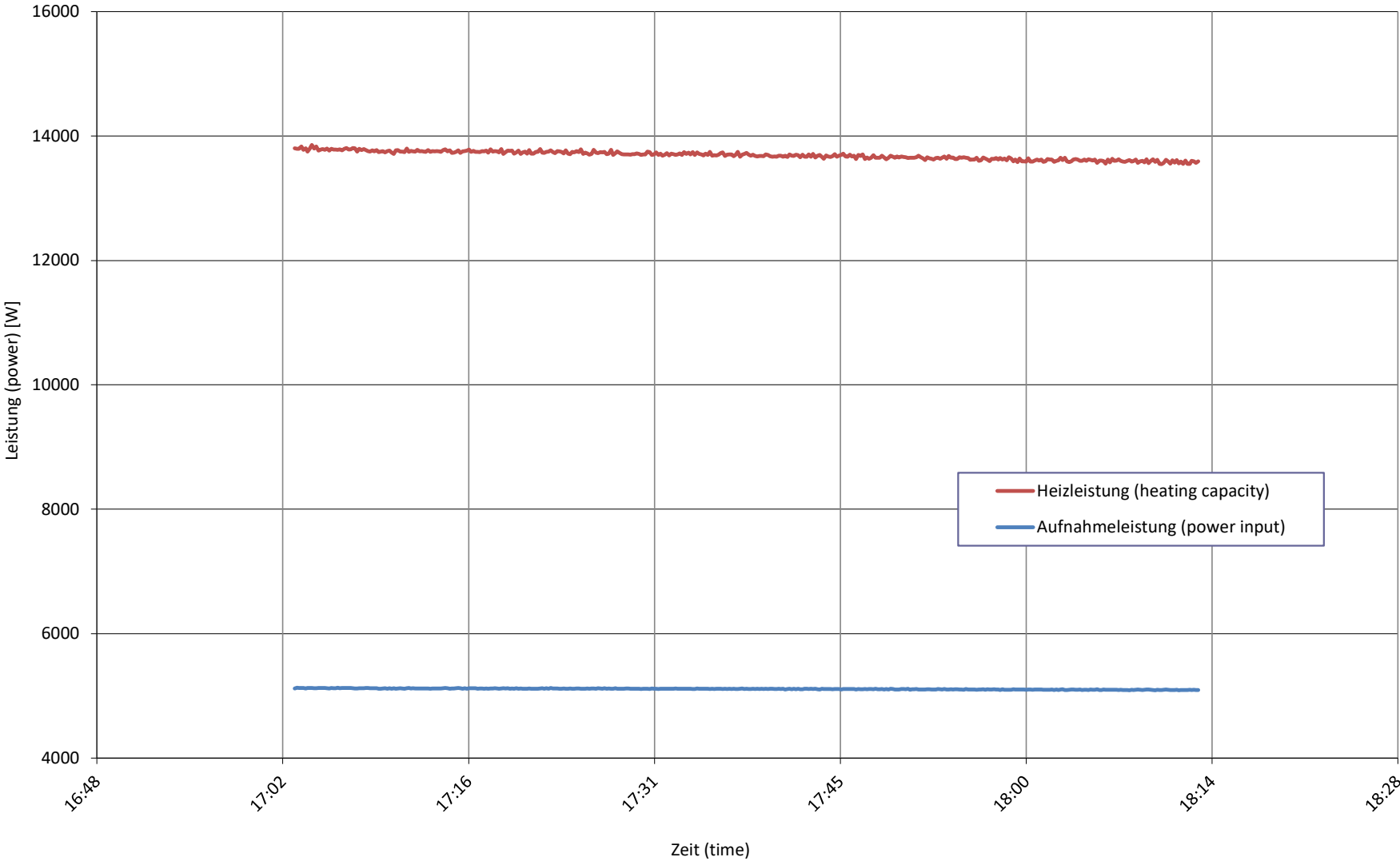
- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 92 rps
- Ventilatorumdrehzahl / fan speed = 780 rpm (Level 10)
- LEVa = 150 pls

7 Prüfer (supervisor) C. Schaible**Prüfnorm** (test standard)
 EN 14511-2:2022
 EN 14511-3:2022
 EN 14825:2022

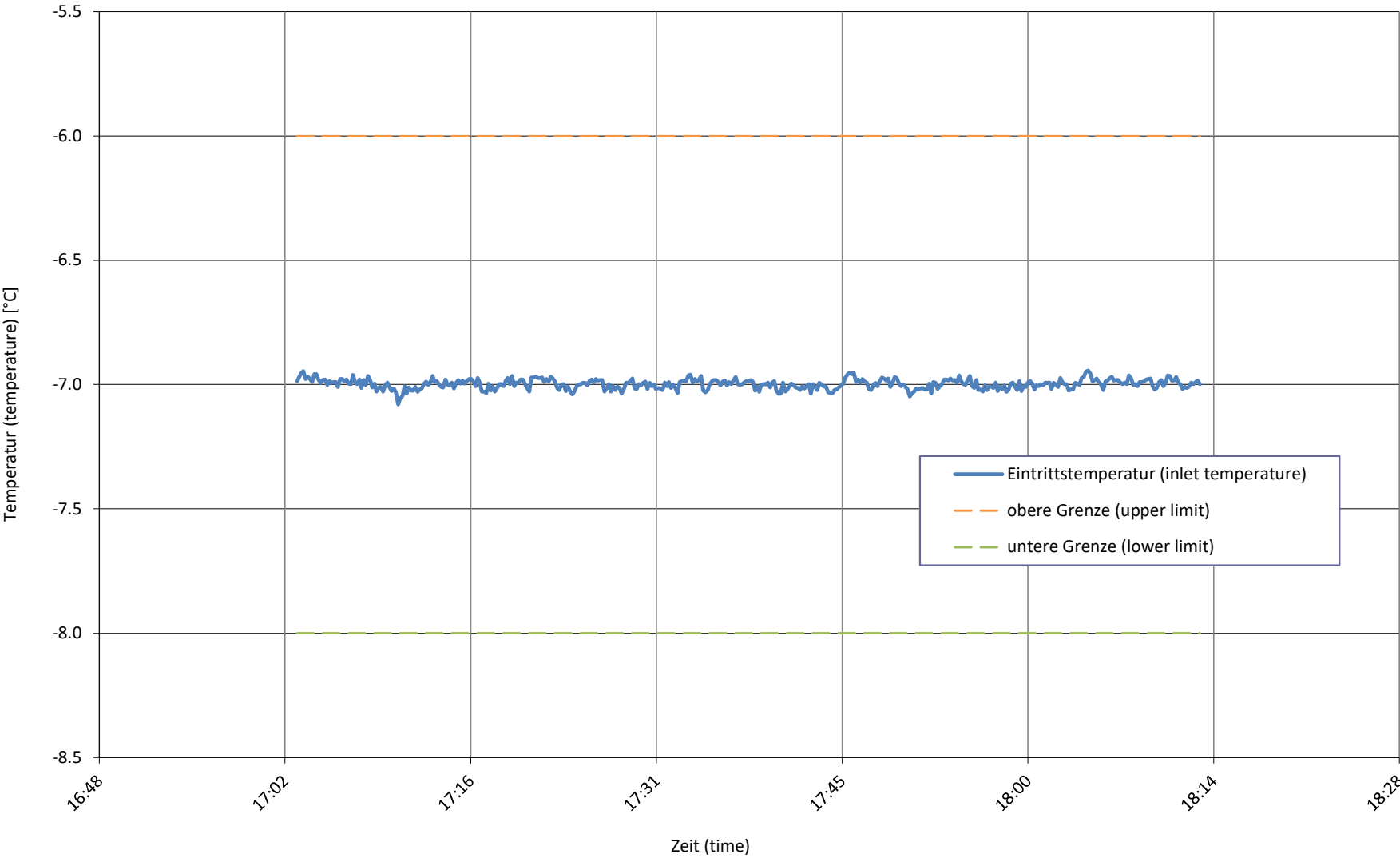
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Wärme- und Aufnahmeleistung bei
heating capacity and input power at

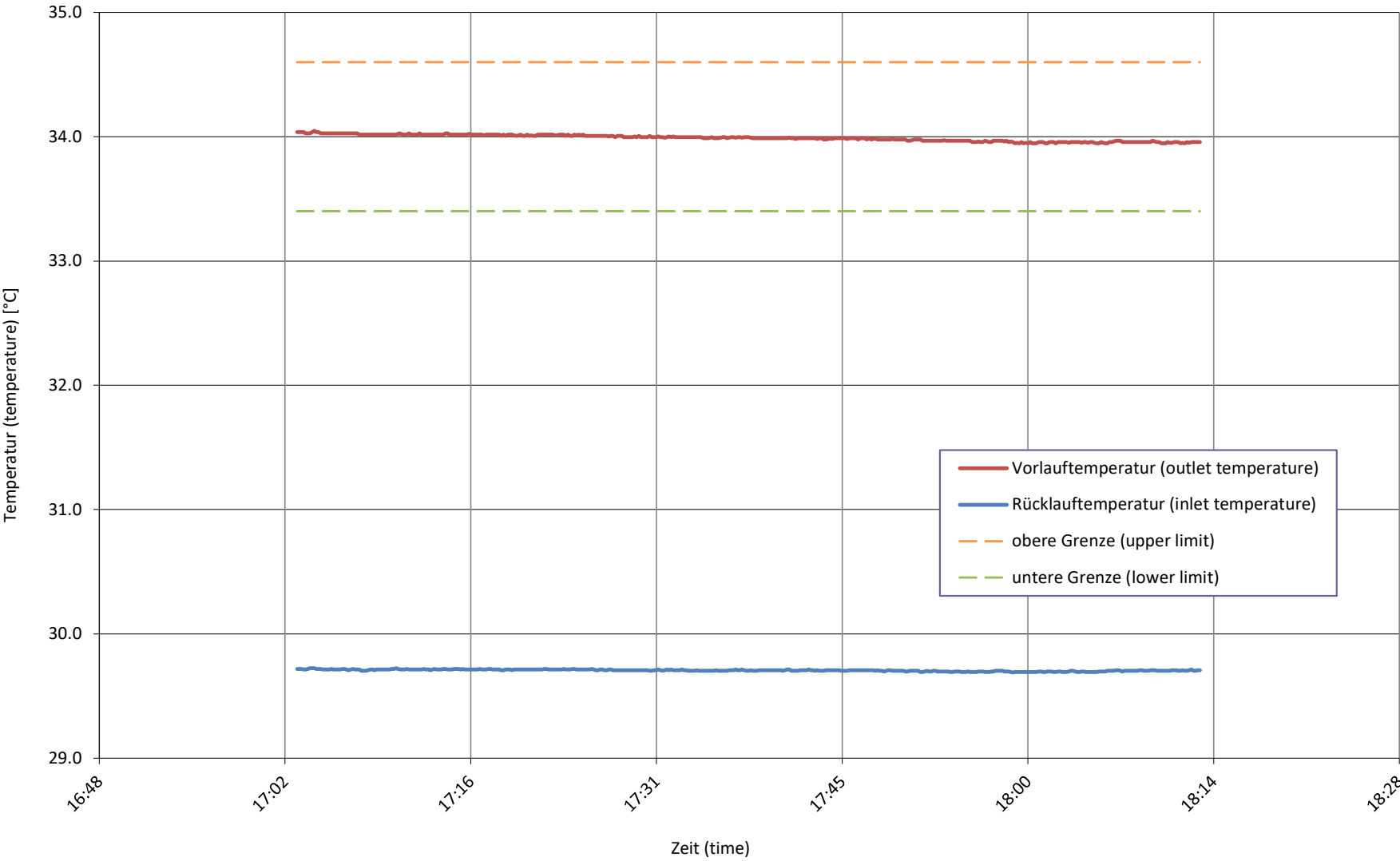
A-7 / Wxx-34 Tbiv



Quellentemperatur bei
source temperature at **A-7 / Wxx-34 Tbiv**

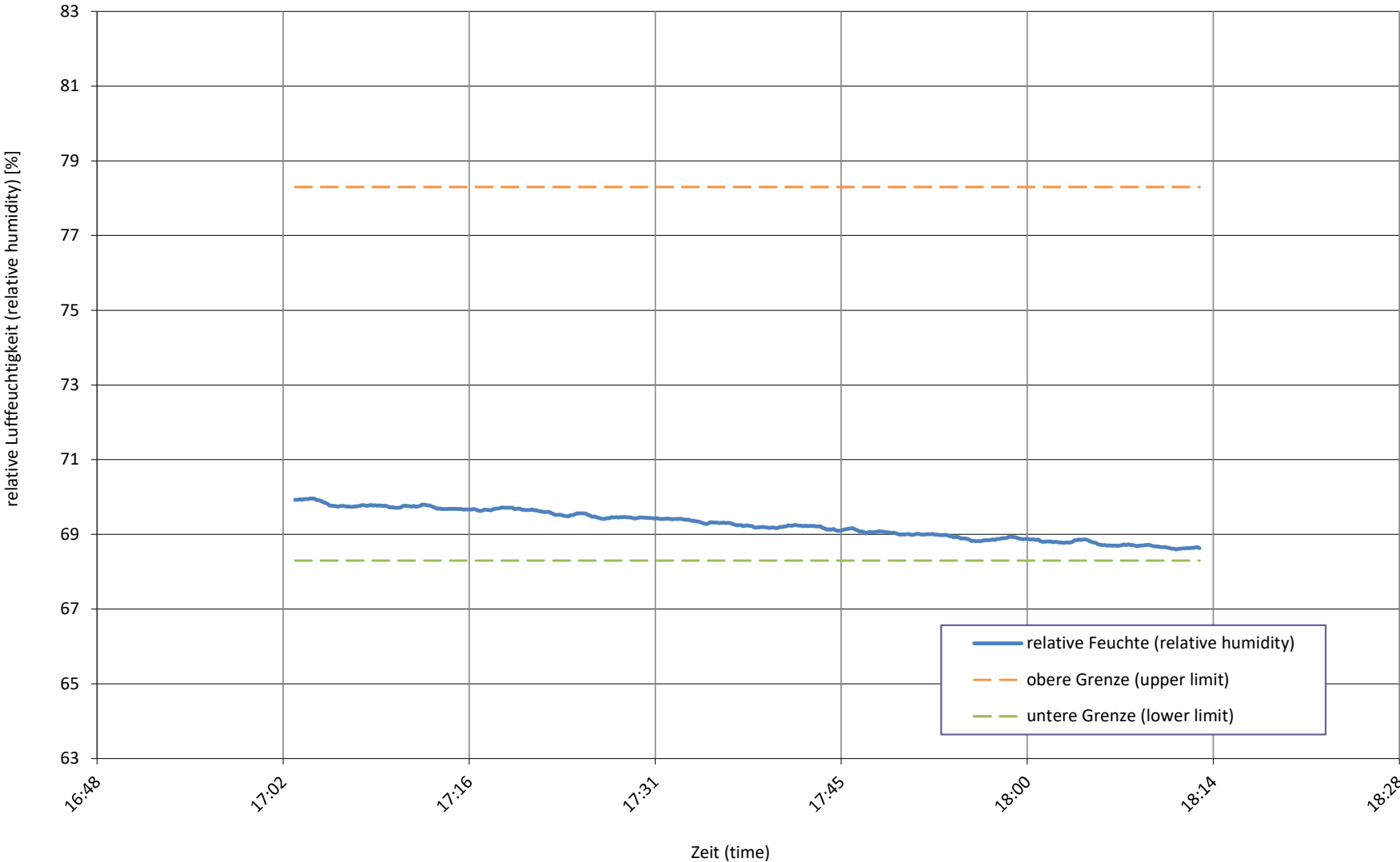


Senkentemperatur bei
sink temperature at **A-7 / Wxx-34 Tbiv**

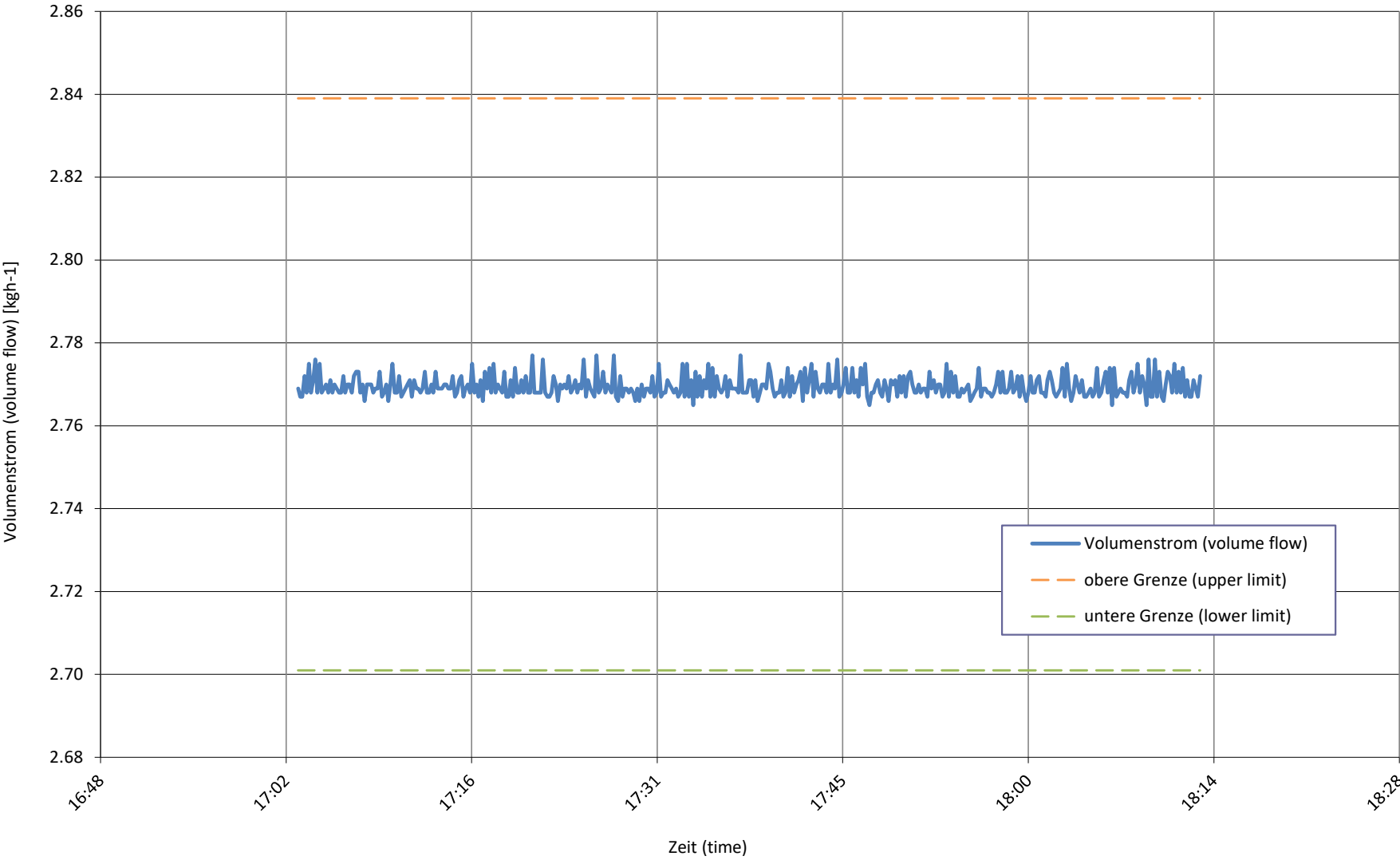


relative Luftfeuchtigkeit bei
relative humidity at

A-7 / Wxx-34 Tbiv



Senkenmassenstrom bei
sink mass flow at **A-7 / Wxx-34 Tbiv**



Prüfbedingung
Test condition

A2 / Wxx-30 B

Prüfnummer
Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 8216 | ± 364 | ± 4.39% |
| a Heizleistung (heating capacity) | W | 8301 | ± 329 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 2.01 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | 0.18 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 84.1 | ± 3.4 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 27.40 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 29.98 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 2769.4 | ± 27.7 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -66.62 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggastemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgastemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 2176 | ± 43 | ± 1.97% |
| Wirkleistung (power input) | W | 2312 | ± 21 | |
| Spannung (voltage) | V | 230.6 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 3.41 | ± 0.02 | |
| Scheinleistung (apparent output) | VA | 2334 | ± 19 | |
| Leistungsfaktor cosp (power factor) | - | 0.991 | ± 0.001 | |
| 3 COP (COP) | - | 3.776 | ± 0.240 | ± 6.36% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 21.4 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 13:46:20 | 21.01.2025 | 2025-01-21 |
| Prüfende (end of test) | hh:mm:ss | 14:56:20 | 21.01.2025 | 2025-01-21 |

6 Bemerkung (remark)

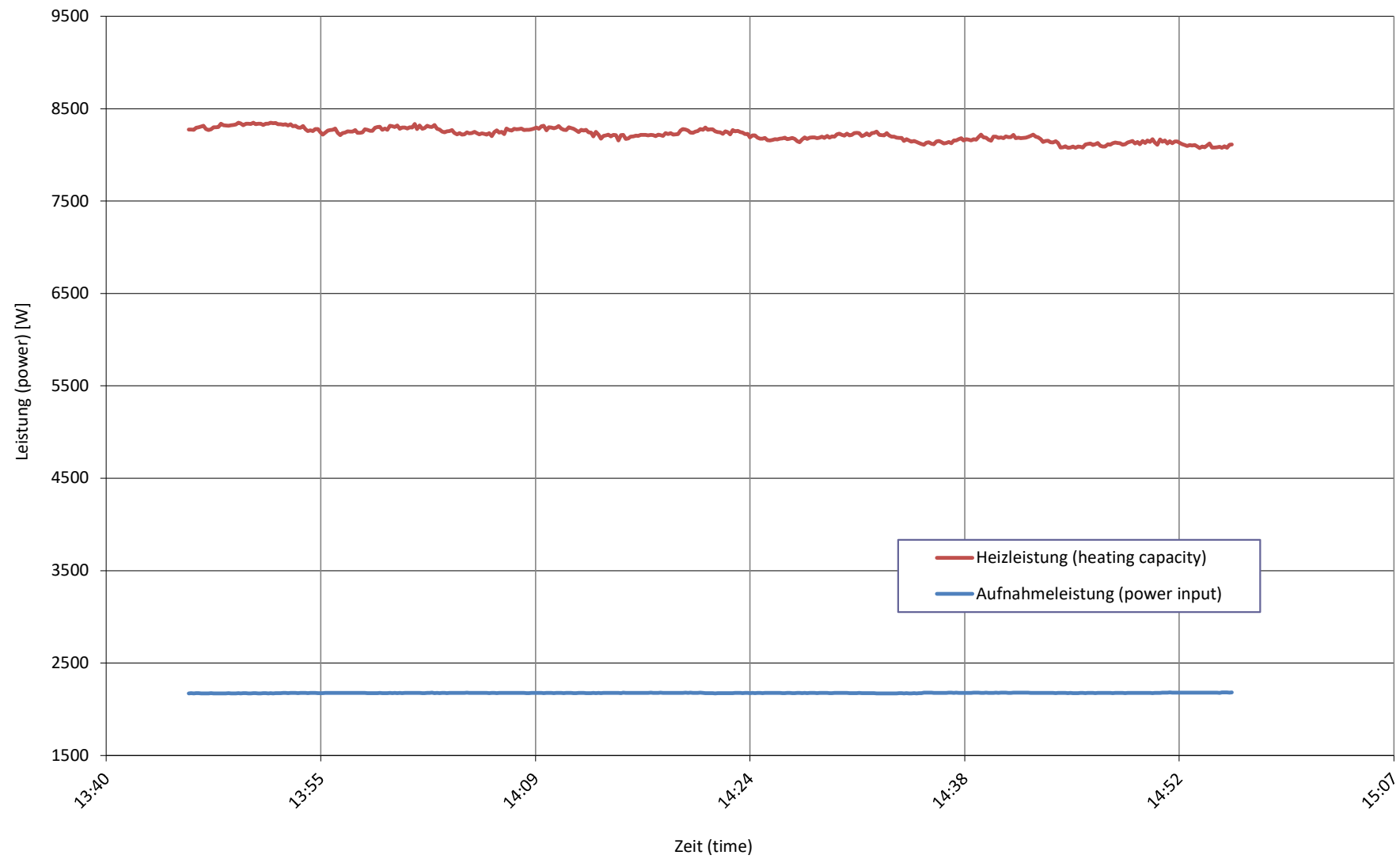
- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 42 rps
- Ventilatorumdrehzahl / fan speed = 780 rpm (Level 10)
- LEVa = 205 pls

7 Prüfer (supervisor) C. Schaible

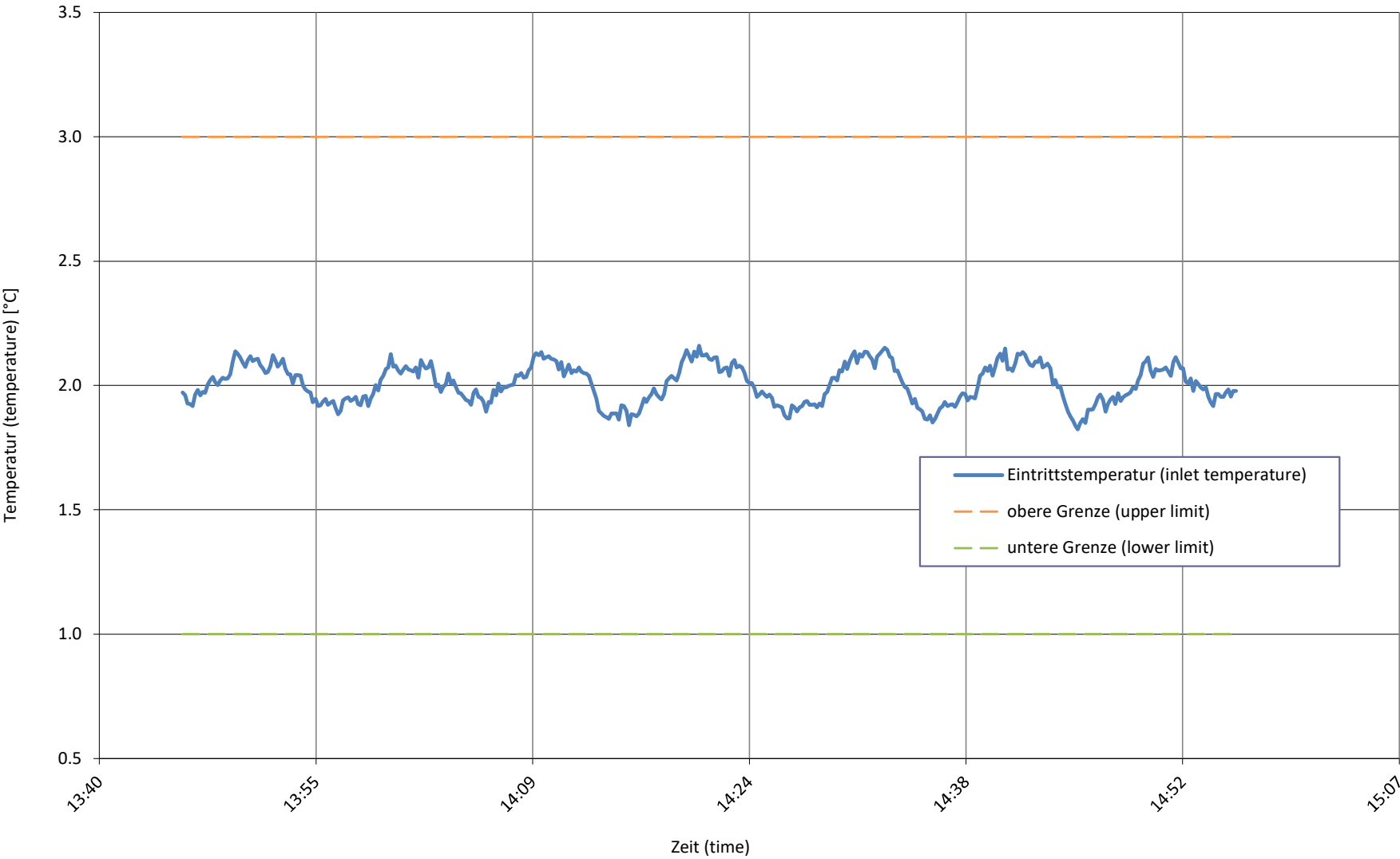
Prüfnorm (test standard)

EN 14511-2:2022
EN 14511-3:2022
EN 14825:2022

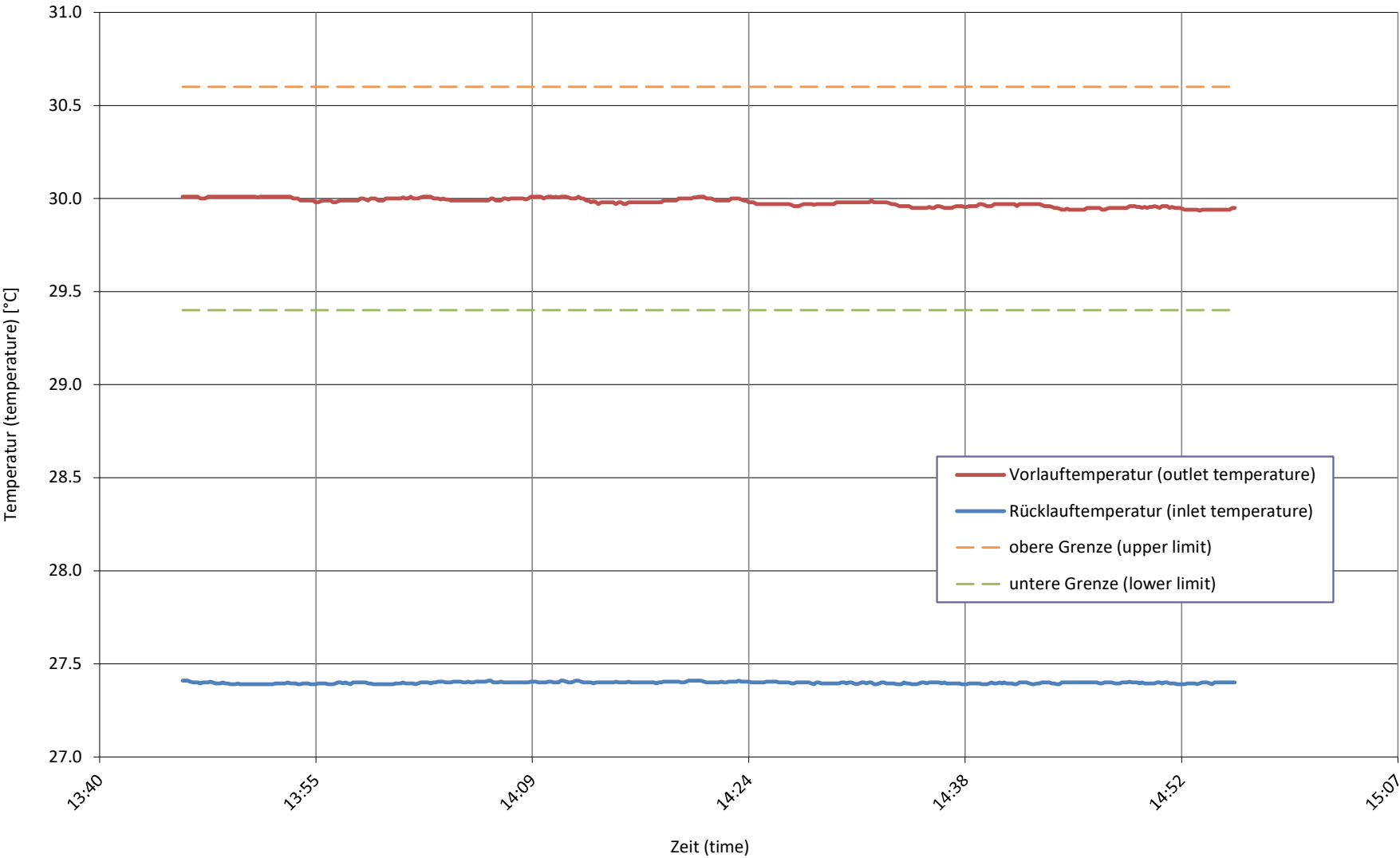
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Wärme- und Aufnahmeleistung bei
heating capacity and input power at**A2 / Wxx-30 B**

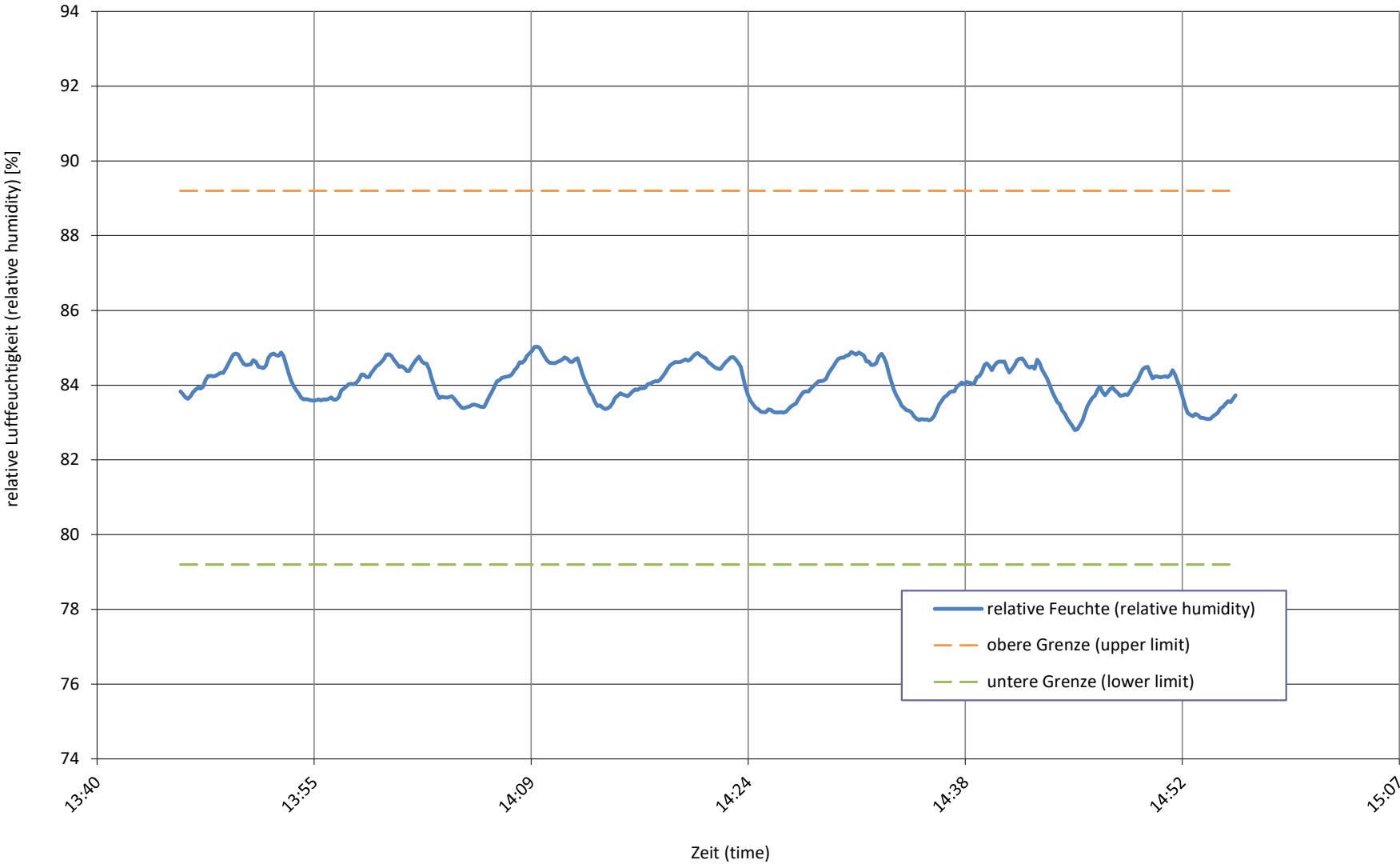
Quellentemperatur bei
source temperature at **A2 / Wxx-30 B**



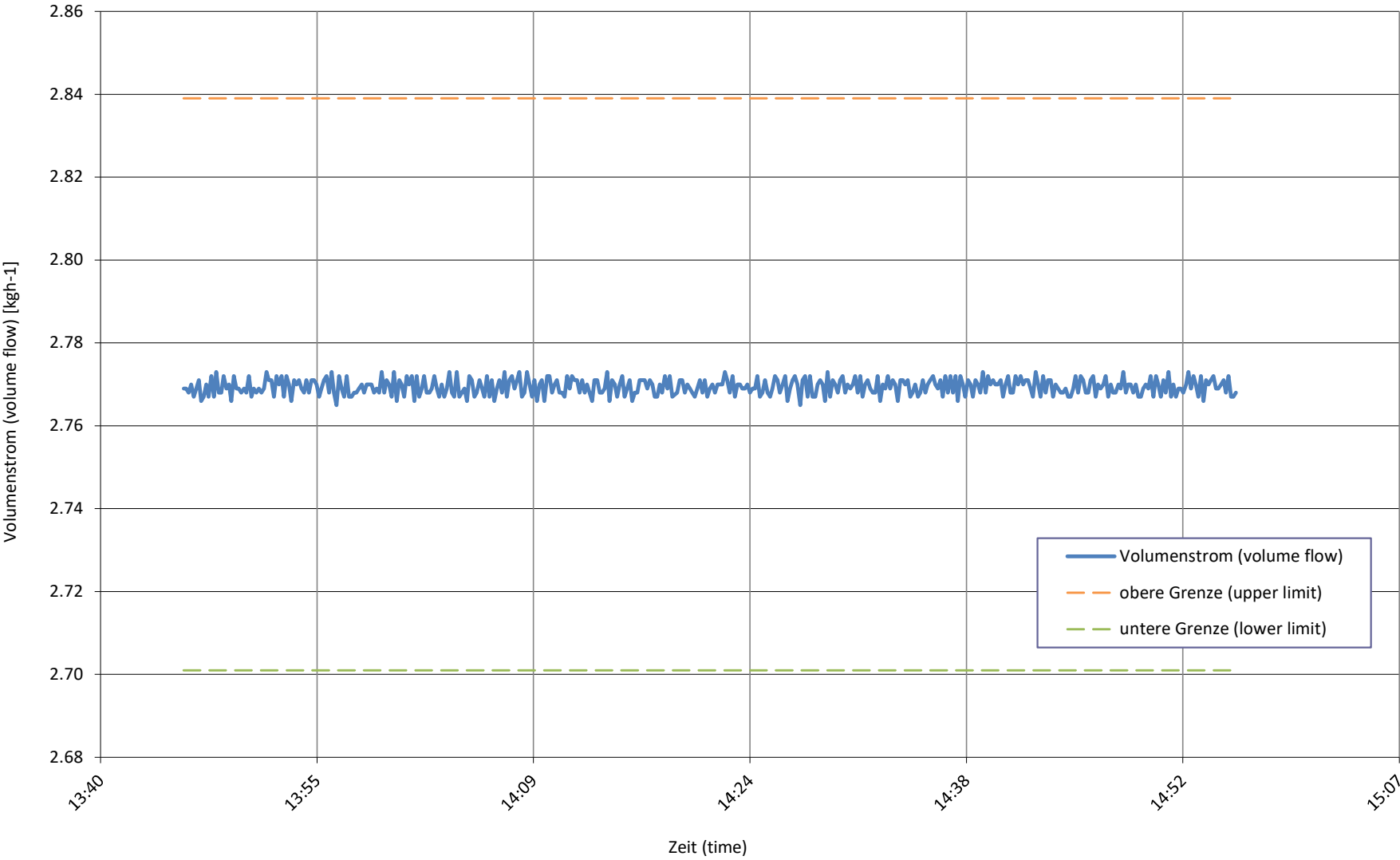
Senktemperatur bei
sink temperature at **A2 / Wxx-30 B**



relative Luftfeuchtigkeit bei
relative humidity at **A2 / Wxx-30 B**



Senkenmassenstrom bei
sink mass flow at **A2 / Wxx-30 B**



Prüfbedingung
 Test condition

A7 / Wxx-27 C

 Prüfnummer
 Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 5640 | ± 359 | ± 6.26% |
| a Heizleistung (heating capacity) | W | 5725 | ± 323 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 7.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | 4.57 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 87.1 | ± 3.5 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 25.20 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 26.98 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 2769.7 | ± 27.7 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -65.91 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggasttemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgasttemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 940 | ± 31 | ± 3.34% |
| Wirkleistung (power input) | W | 1075 | ± 9 | |
| Spannung (voltage) | V | 232.8 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 1.97 | ± 0.01 | |
| Scheinleistung (apparent output) | VA | 1362 | ± 11 | |
| Leistungsfaktor cosp (power factor) | - | 0.790 | ± 0.001 | |
| 3 COP (COP) | - | 5.999 | ± 0.576 | ± 9.61% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 21.2 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 10:29:00 | 22.01.2025 | 2025-01-22 |
| Prüfende (end of test) | hh:mm:ss | 11:39:00 | 22.01.2025 | 2025-01-22 |

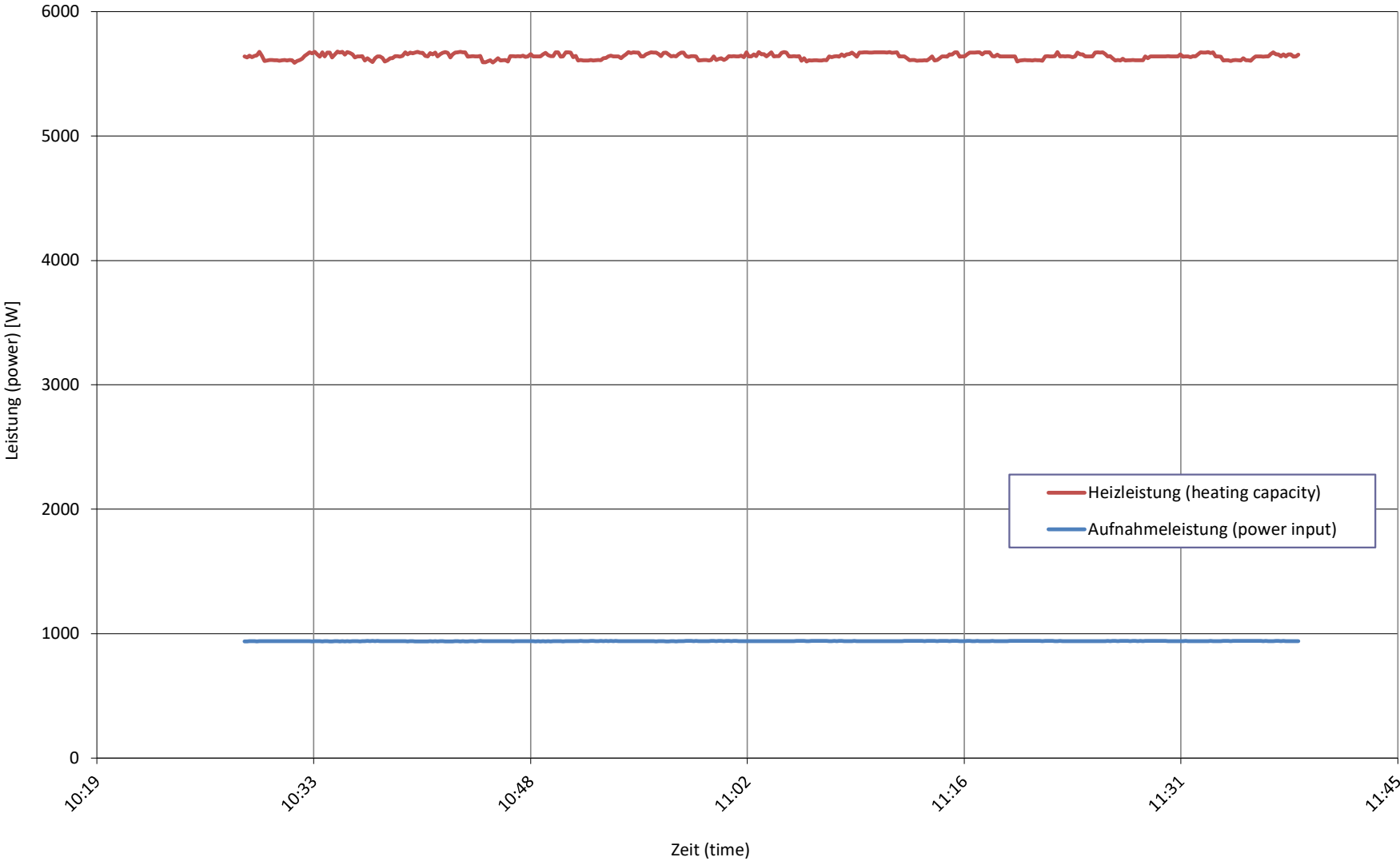
6 Bemerkung (remark)

- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 23 rps
- Ventilatorumdrehzahl / fan speed = 400 rpm (Level 6)

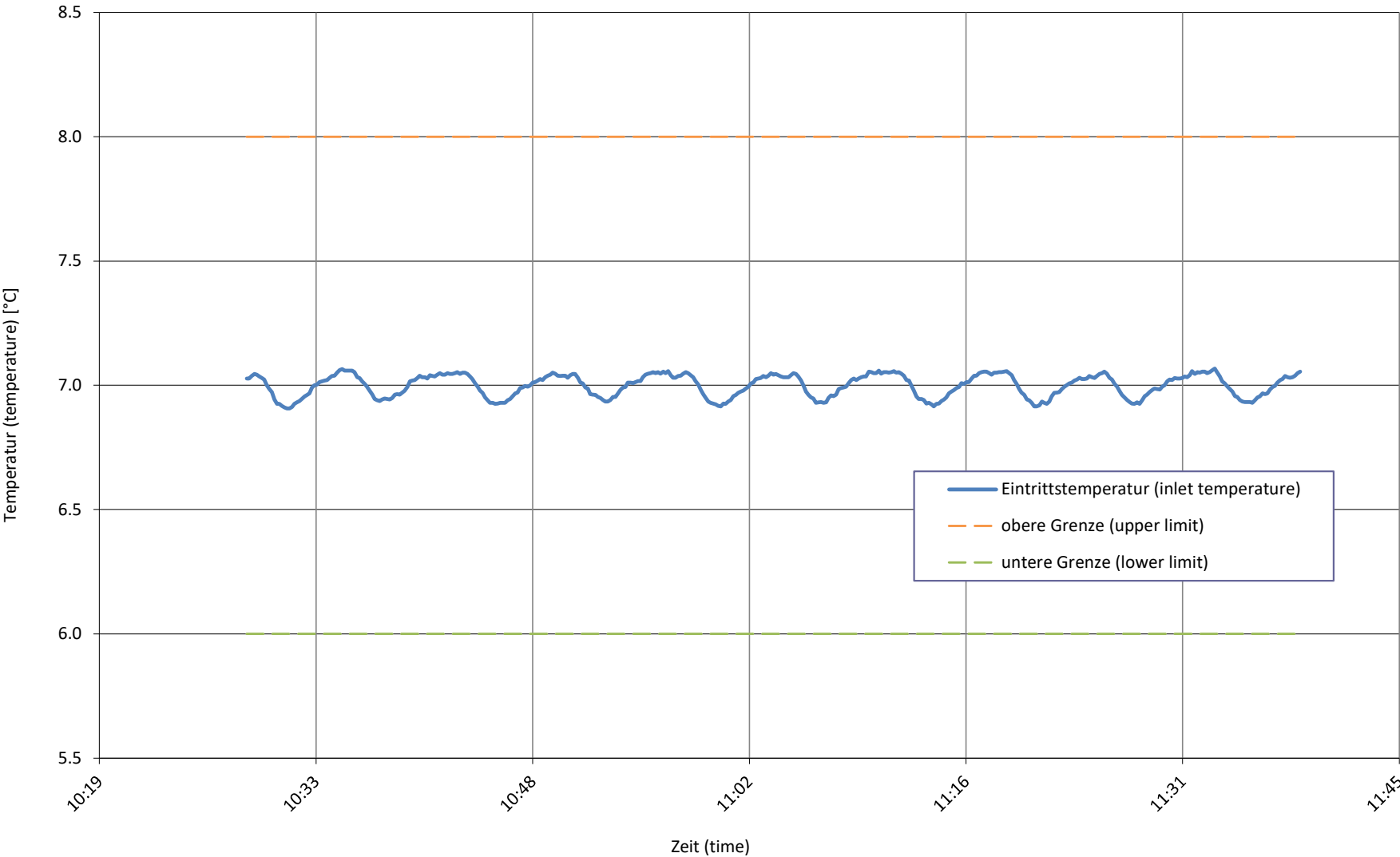
7 Prüfer (supervisor) C. Schaible**Prüfnorm** (test standard)
 EN 14511-2:2022
 EN 14511-3:2022
 EN 14825:2022

 passed
 passed
 passed

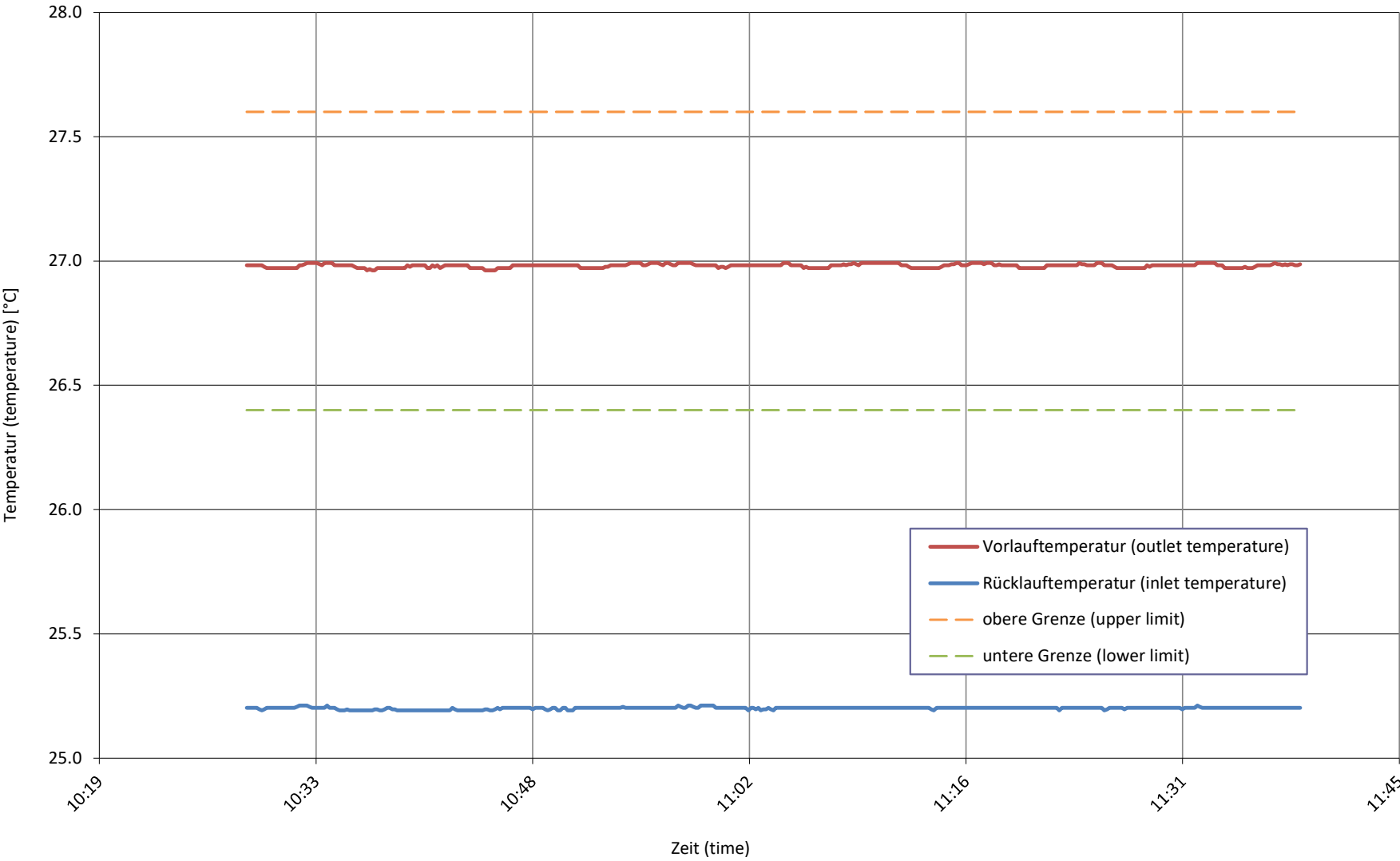
Wärme- und Aufnahmeleistung bei
heating capacity and input power at **A7 / Wxx-27 C**



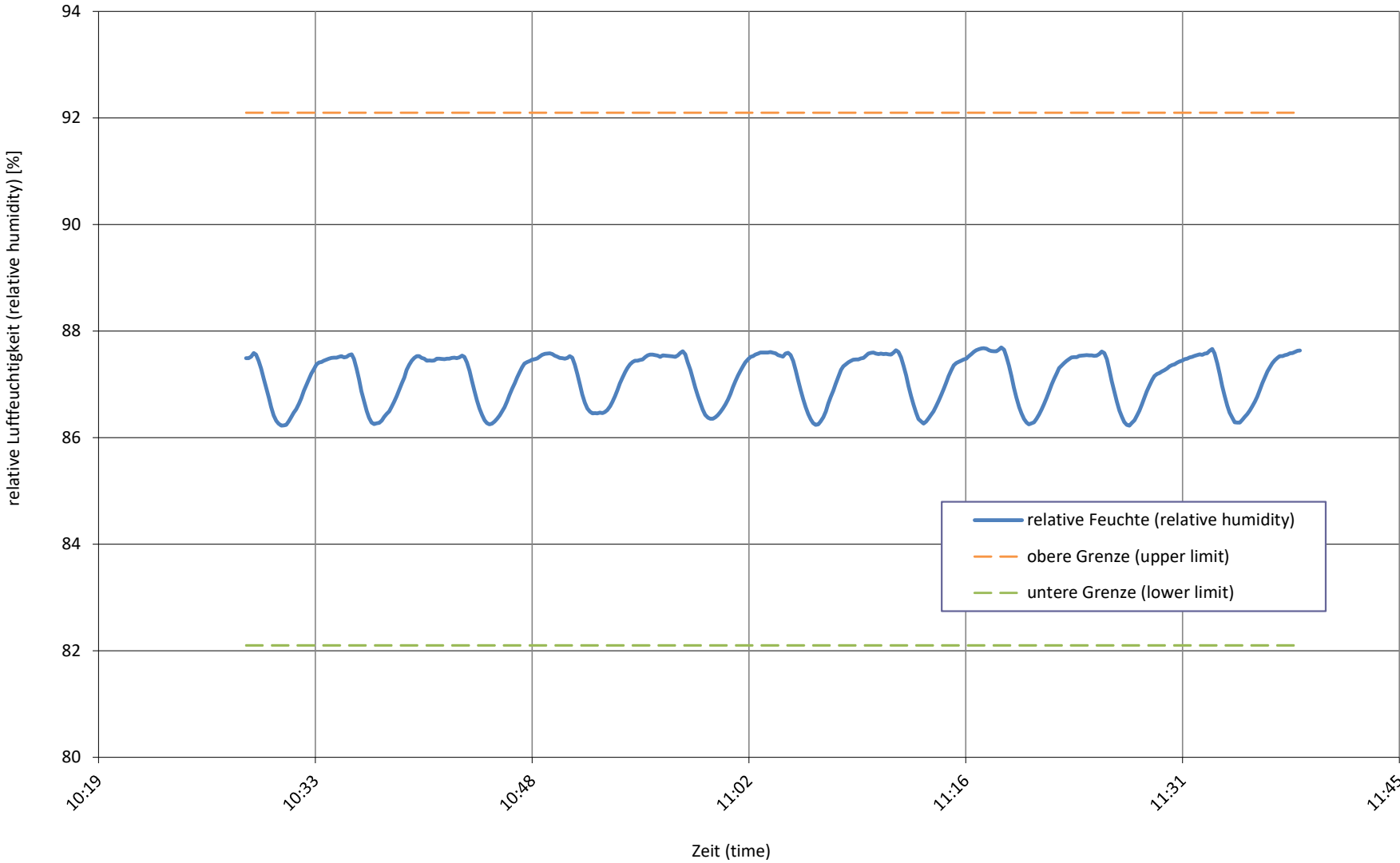
Quellentemperatur bei
source temperature at **A7 / Wxx-27 C**



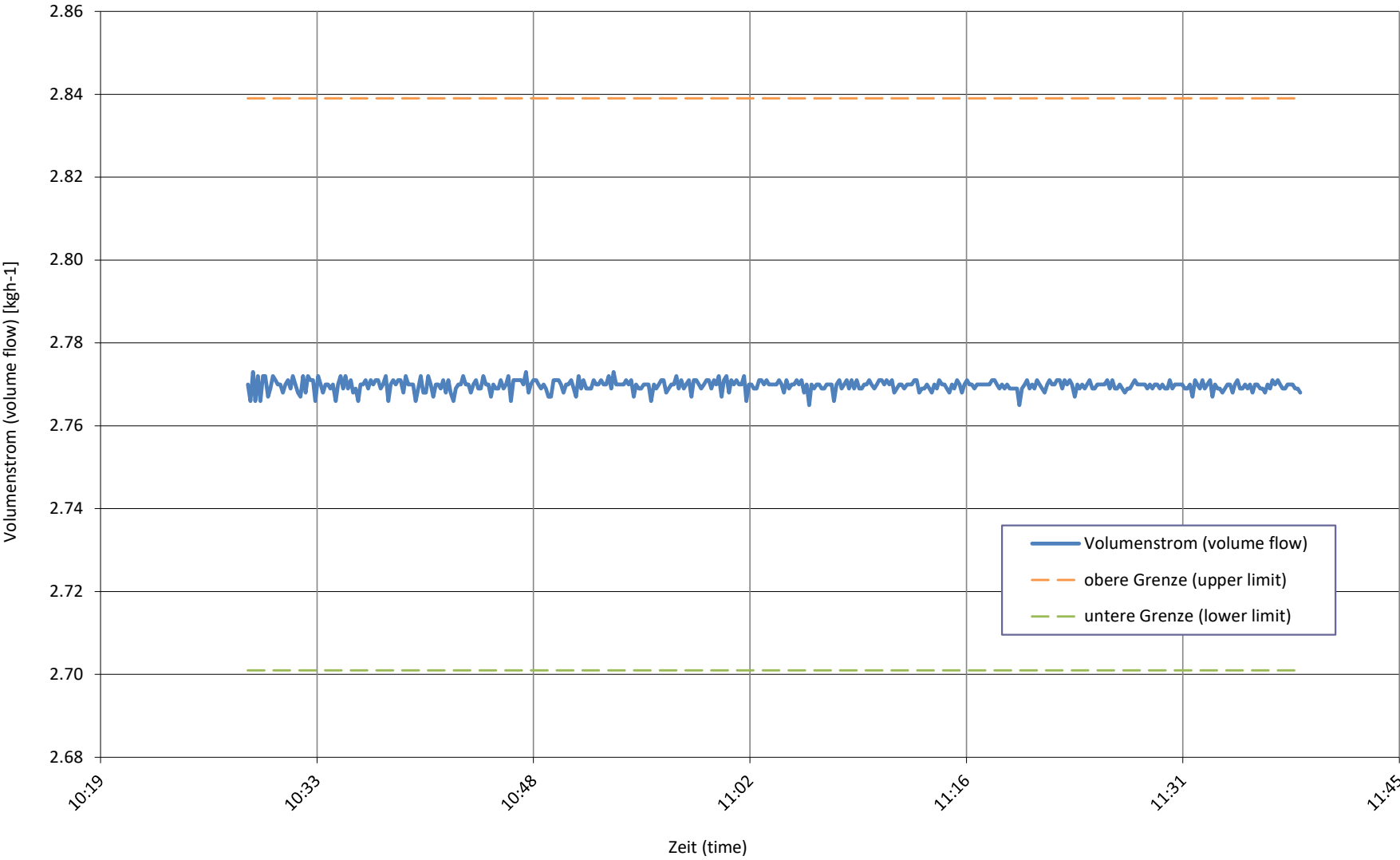
Senktemperatur bei
sink temperature at **A7 / Wxx-27 C**



relative Luftfeuchtigkeit bei
relative humidity at **A7 / Wxx-27 C**



Senkenmassenstrom bei
sink mass flow at **A7 / Wxx-27 C**



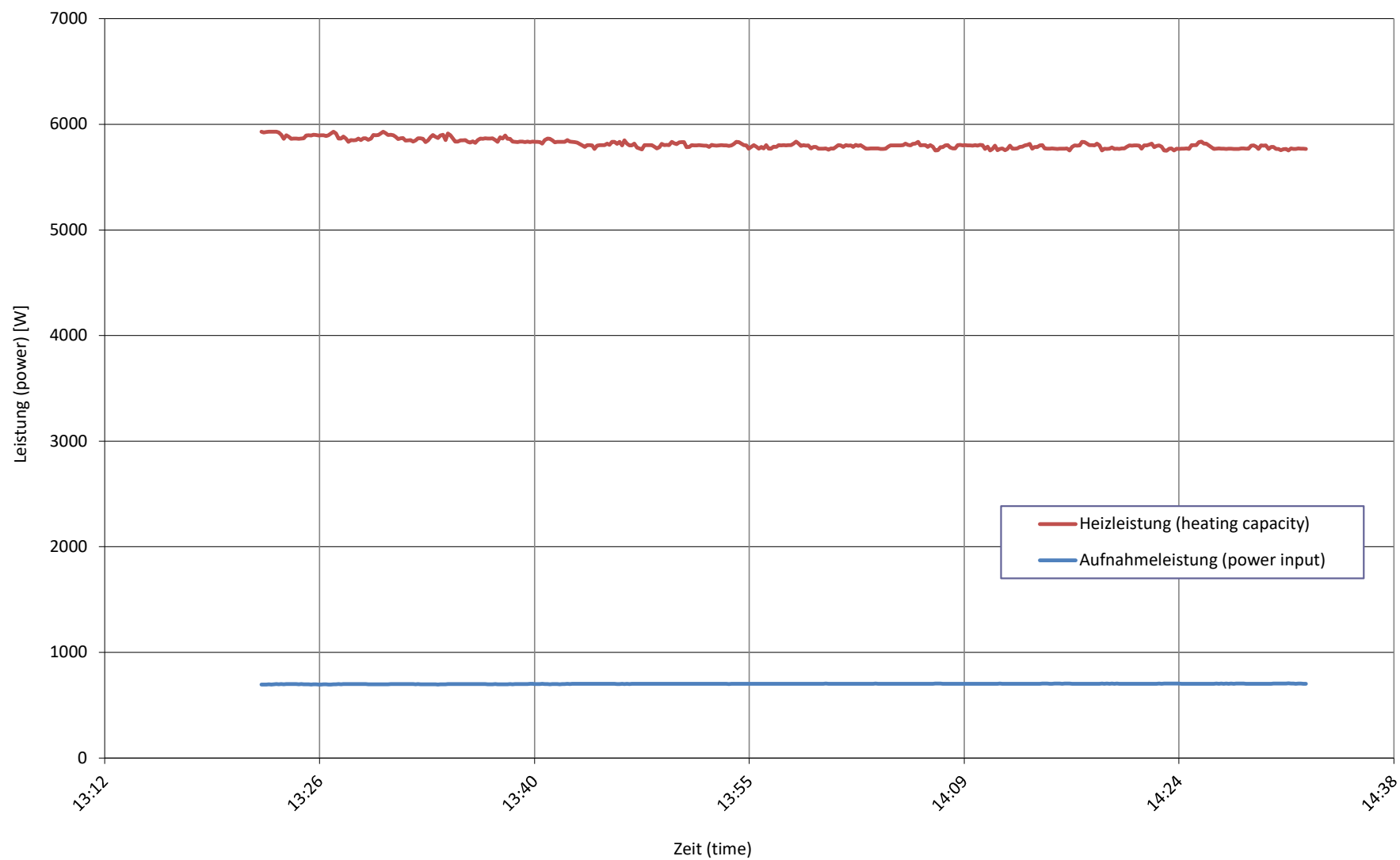
Prüfbedingung
Test condition

A12 / Wxx-24 D

Prüfnummer
Test number

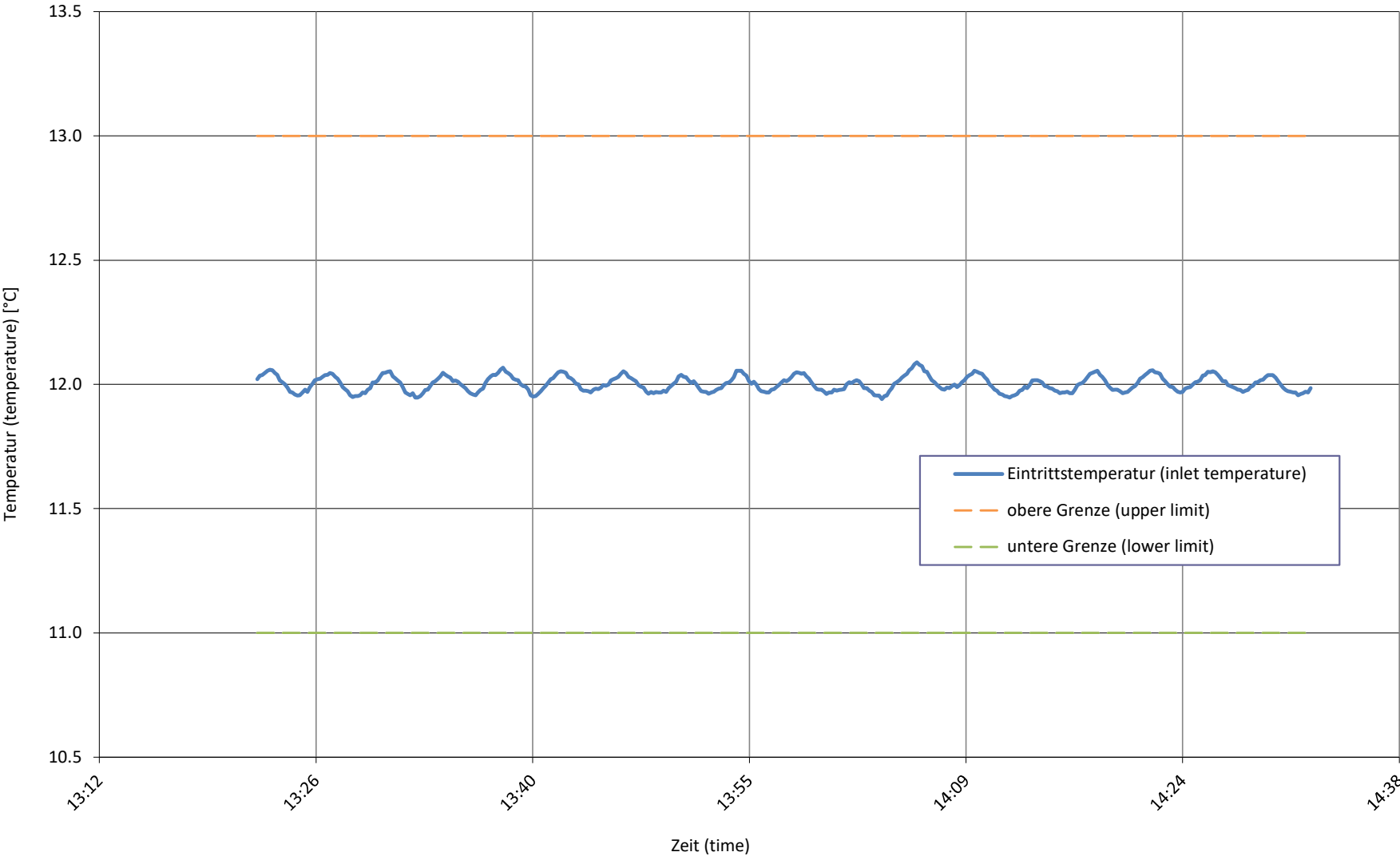
LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|---|---------------------------------|---|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 5813 | ± 359 | ± 6.09% |
| a Heizleistung (heating capacity) | W | 5898 | ± 324 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 12.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | 9.21 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 89.2 | ± 2.4 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 23.21 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 25.05 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 2769.6 | ± 27.7 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -65.64 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggastemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgastemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 702 | ± 29 | ± 4.16% |
| Wirkleistung (power input) | W | 837 | ± 7 | |
| Spannung (voltage) | V | 231.9 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 1.54 | ± 0.01 | |
| Scheinleistung (apparent output) | VA | 1063 | ± 9 | |
| Leistungsfaktor cosp (power factor) | - | 0.787 | ± 0.001 | |
| 3 COP (COP) | - | 8.281 | ± 0.848 | ± 10.25% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 20.9 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 13:22:30 | 23.01.2025 | 2025-01-23 |
| Prüfende (end of test) | hh:mm:ss | 14:32:30 | 23.01.2025 | 2025-01-23 |
| 6 Bemerkung (remark) - Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump - Kompressorfrequenz / compressor speed = 20 rps - Ventilatorumdrehzahl / fan speed = 320 rpm (Level 5) | | | | |
| 7 Prüfer (supervisor) C. Schaible | Prüfnorm (test standard) | EN 14511-2:2022 EN 14511-3:2022 EN 14825:2022 | passed passed passed | |

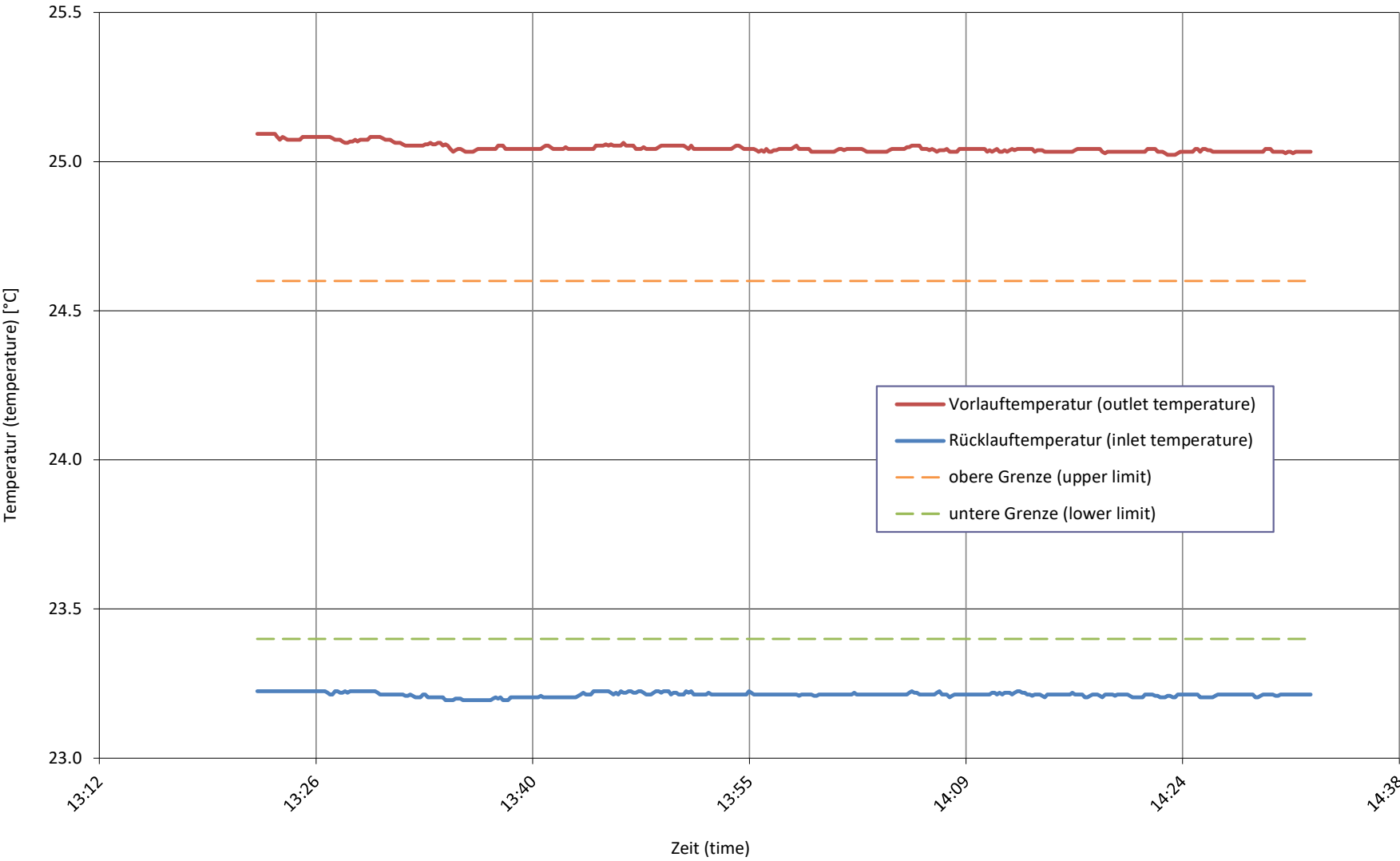
Wärme- und Aufnahmeleistung bei
heating capacity and input power at**A12 / Wxx-24 D**

Quellentemperatur bei
source temperature at

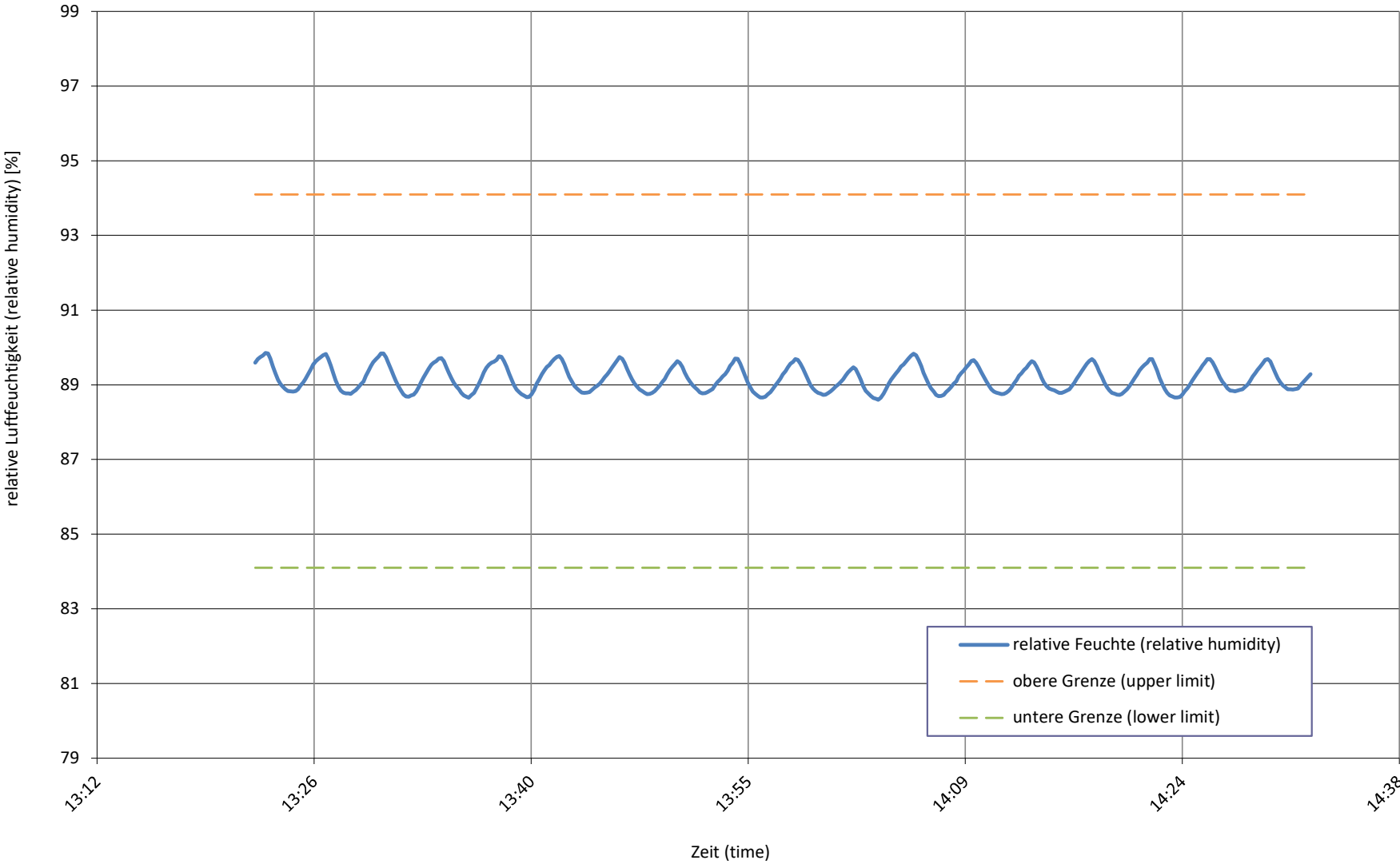
A12 / Wxx-24 D



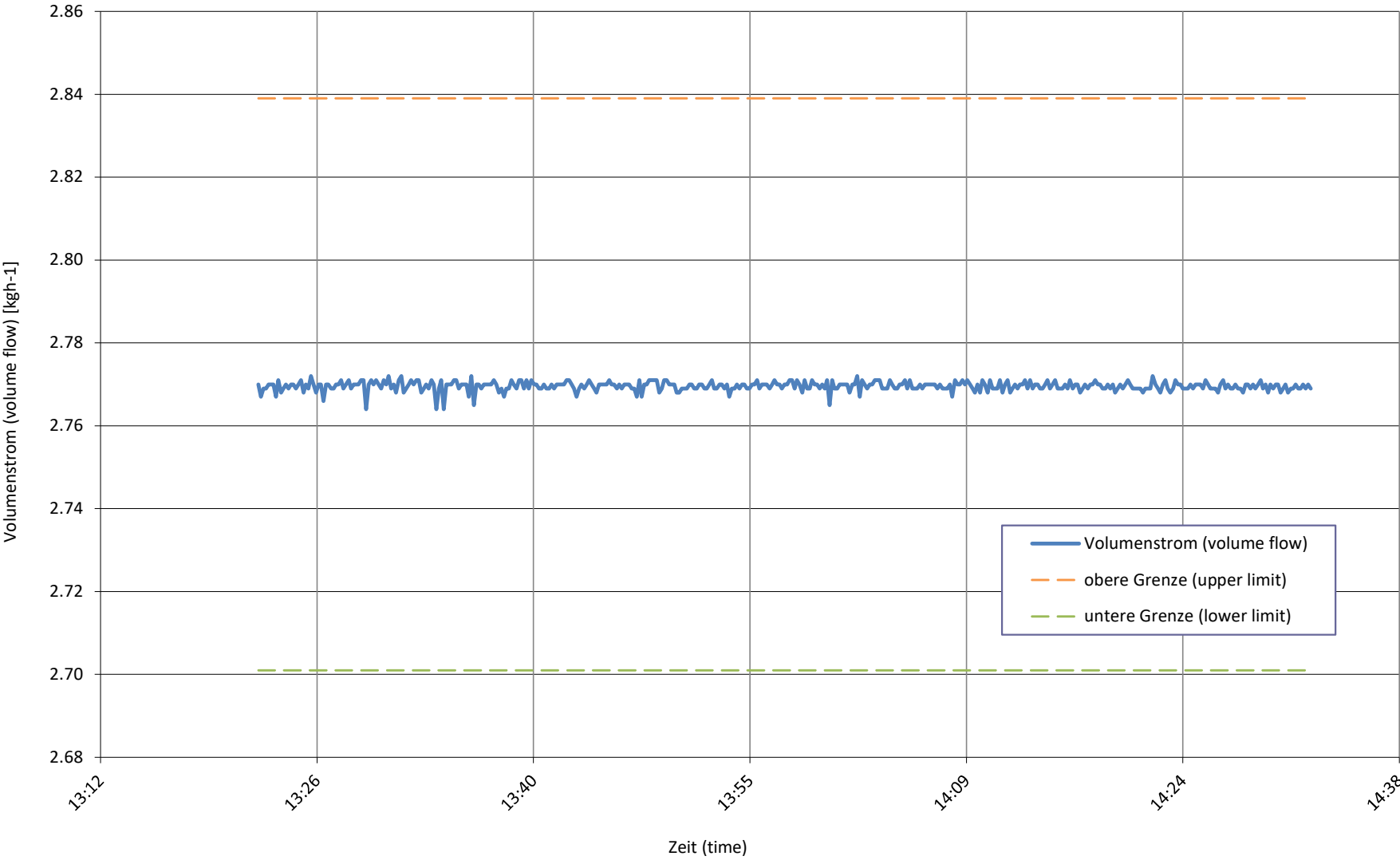
Senktemperatur bei
sink temperature at **A12 / Wxx-24 D**



relative Luftfeuchtigkeit bei
relative humidity at **A12 / Wxx-24 D**



Senkenmassenstrom bei
sink mass flow at **A12 / Wxx-24 D**



Prüfbedingung
Test condition

A-10 / Wxx-35 E

Prüfnummer
Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 13958 | ± 388 | ± 2.76% |
| a Heizleistung (heating capacity) | W | 14052 | ± 348 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | -10.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | -12.86 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 67.1 | ± 2.7 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 30.60 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 34.97 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 2769.5 | ± 27.7 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -76.51 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggastemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgastemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 5893 | ± 79 | ± 1.34% |
| Wirkleistung (power input) | W | 6046 | ± 54 | |
| Spannung (voltage) | V | 231.5 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 8.93 | ± 0.05 | |
| Scheinleistung (apparent output) | VA | 6083 | ± 49 | |
| Leistungsfaktor cosp (power factor) | - | 0.994 | ± 0.001 | |
| 3 COP (COP) | - | 2.369 | ± 0.097 | ± 4.11% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 21.1 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 12:58:40 | 17.01.2025 | 2025-01-17 |
| Prüfende (end of test) | hh:mm:ss | 14:08:40 | 17.01.2025 | 2025-01-17 |

6 Bemerkung (remark)

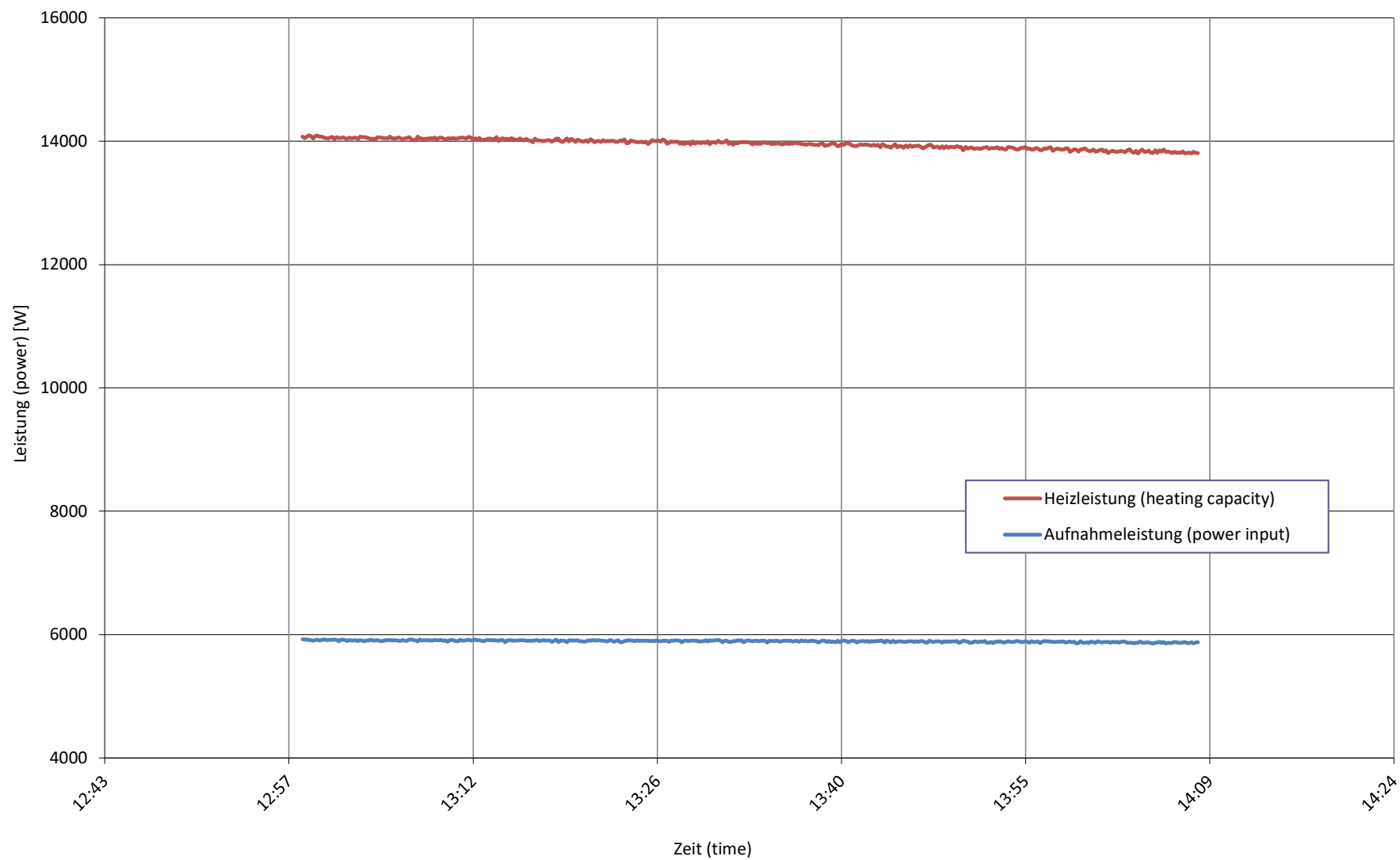
- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 105 rps
- Ventilatorumdrehzahl / fan speed = 780 rpm (Level 10)
- LEVa = 170 pls

7 Prüfer (supervisor) C. Schaible

Prüfnorm (test standard)

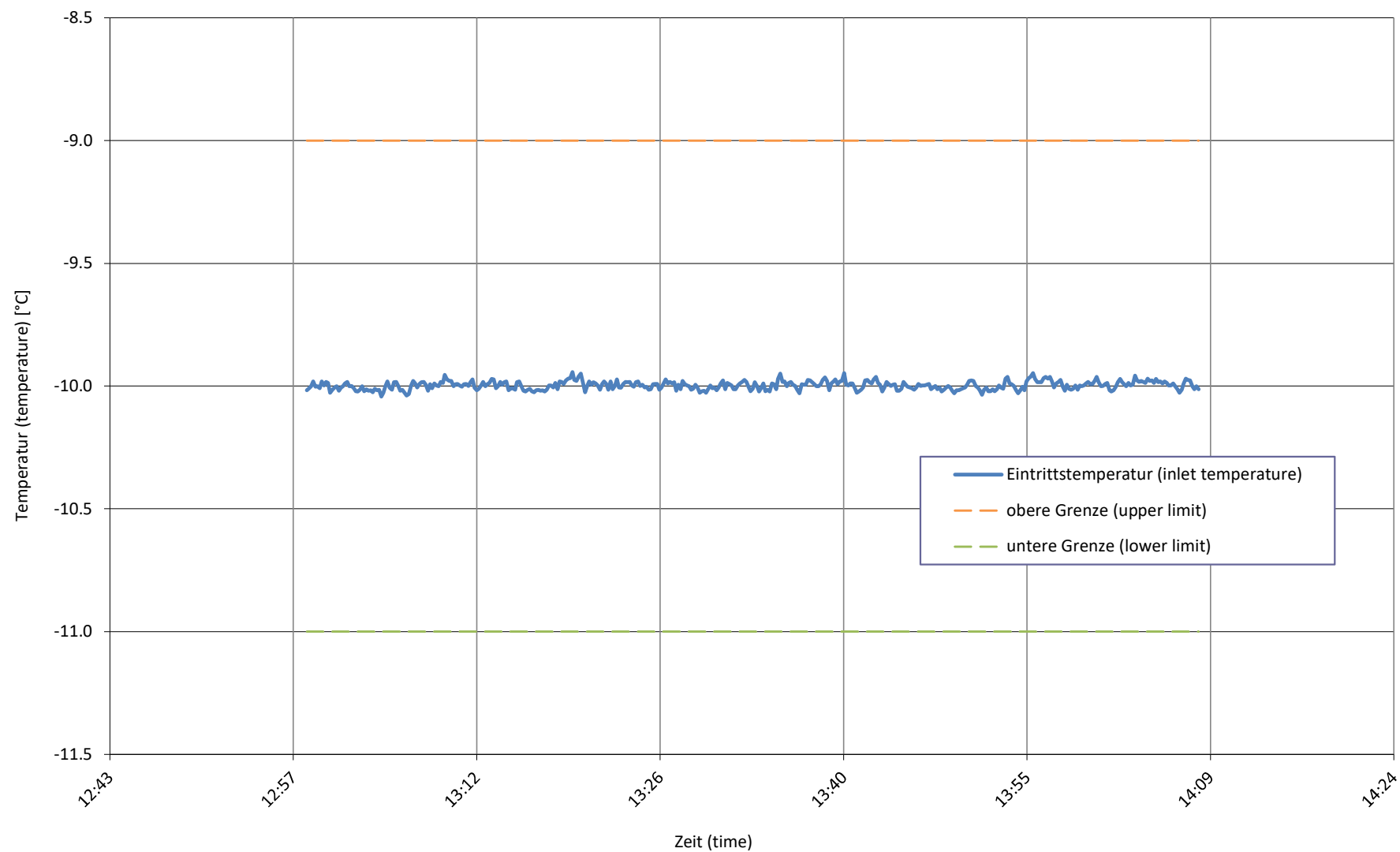
EN 14511-2:2022
EN 14511-3:2022
EN 14825:2022

passed
passed
passed

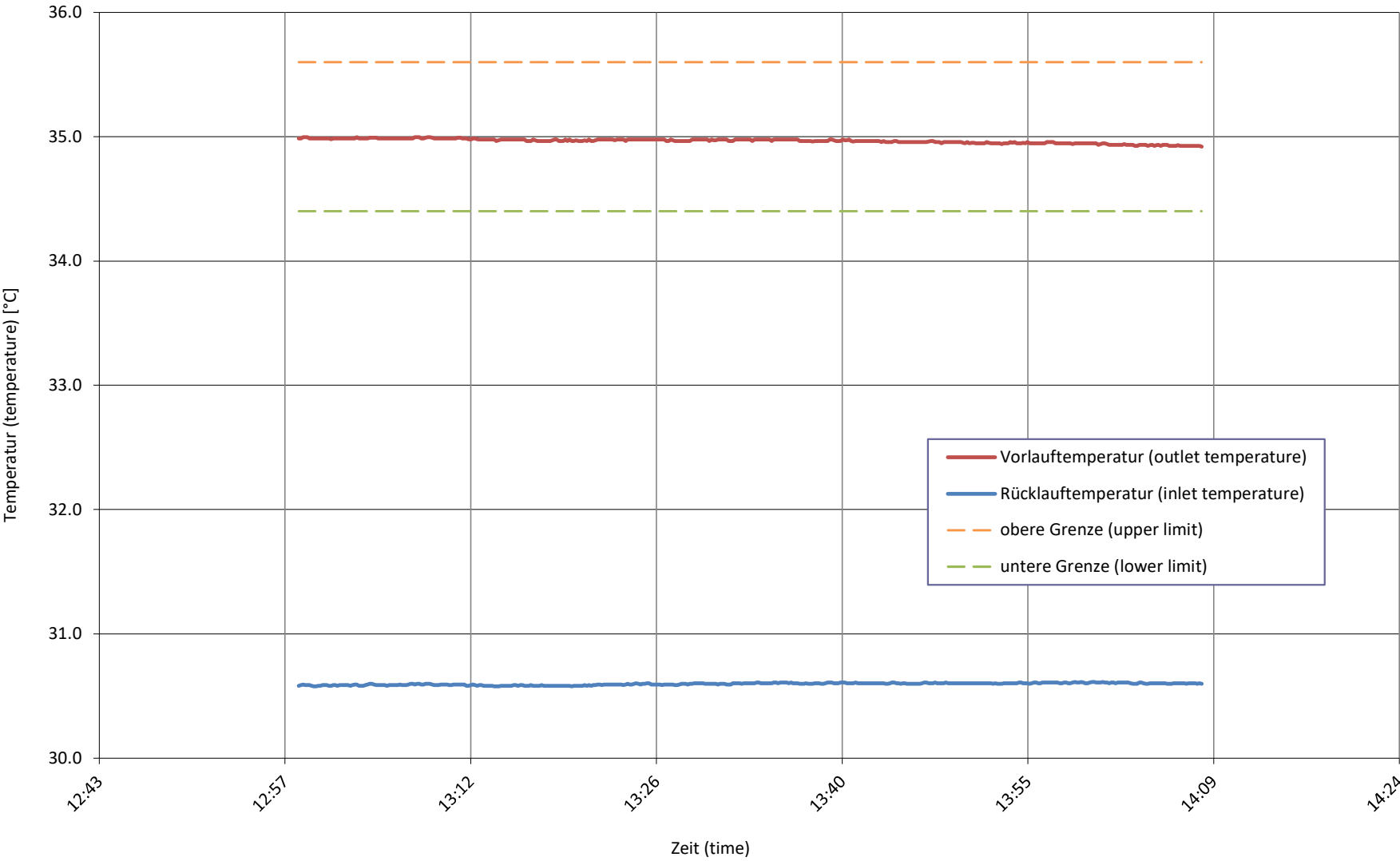
Wärme- und Aufnahmeleistung bei
heating capacity and input power at**A-10 / Wxx-35 E**

Quellentemperatur bei
source temperature at

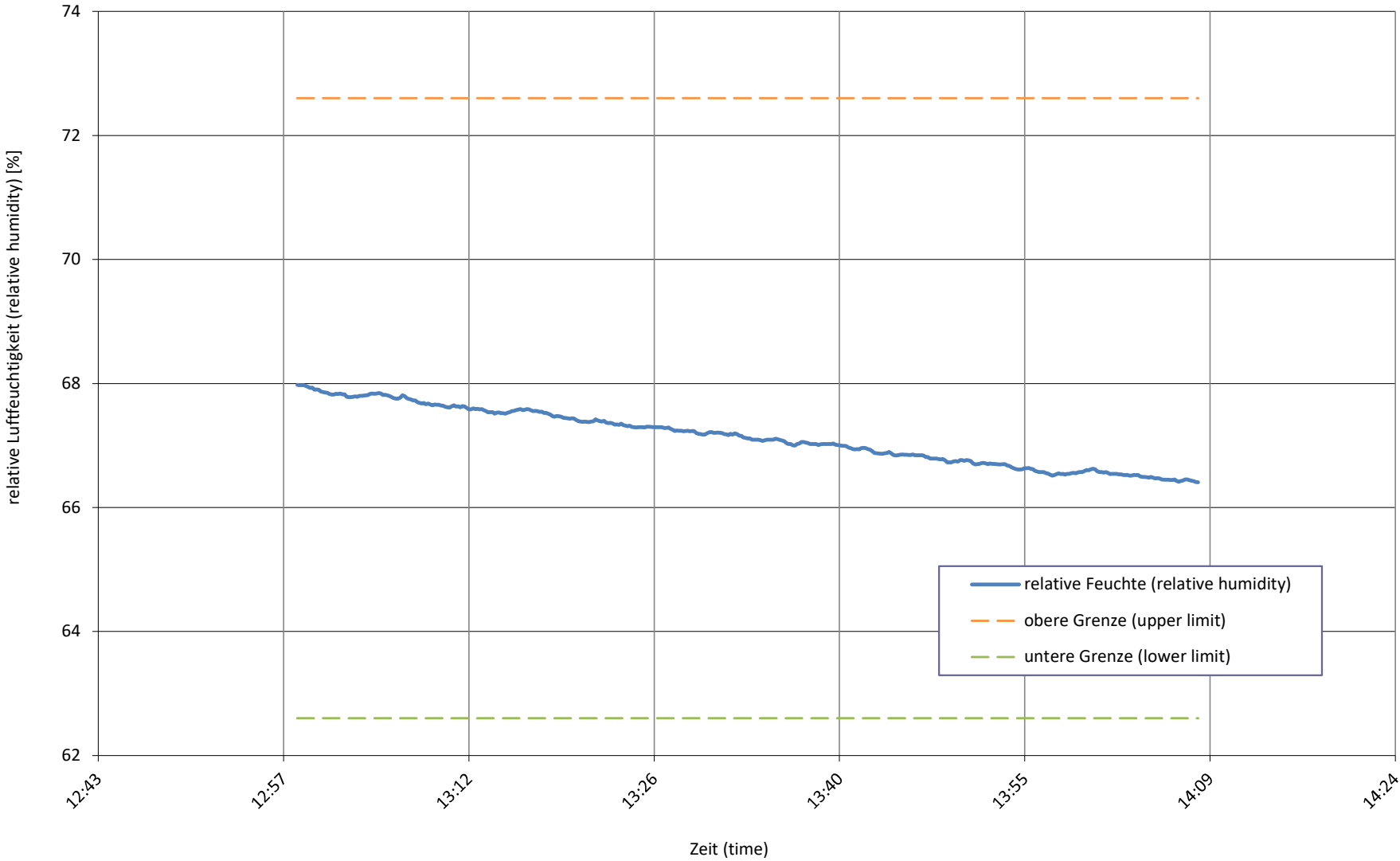
A-10 / Wxx-35 E



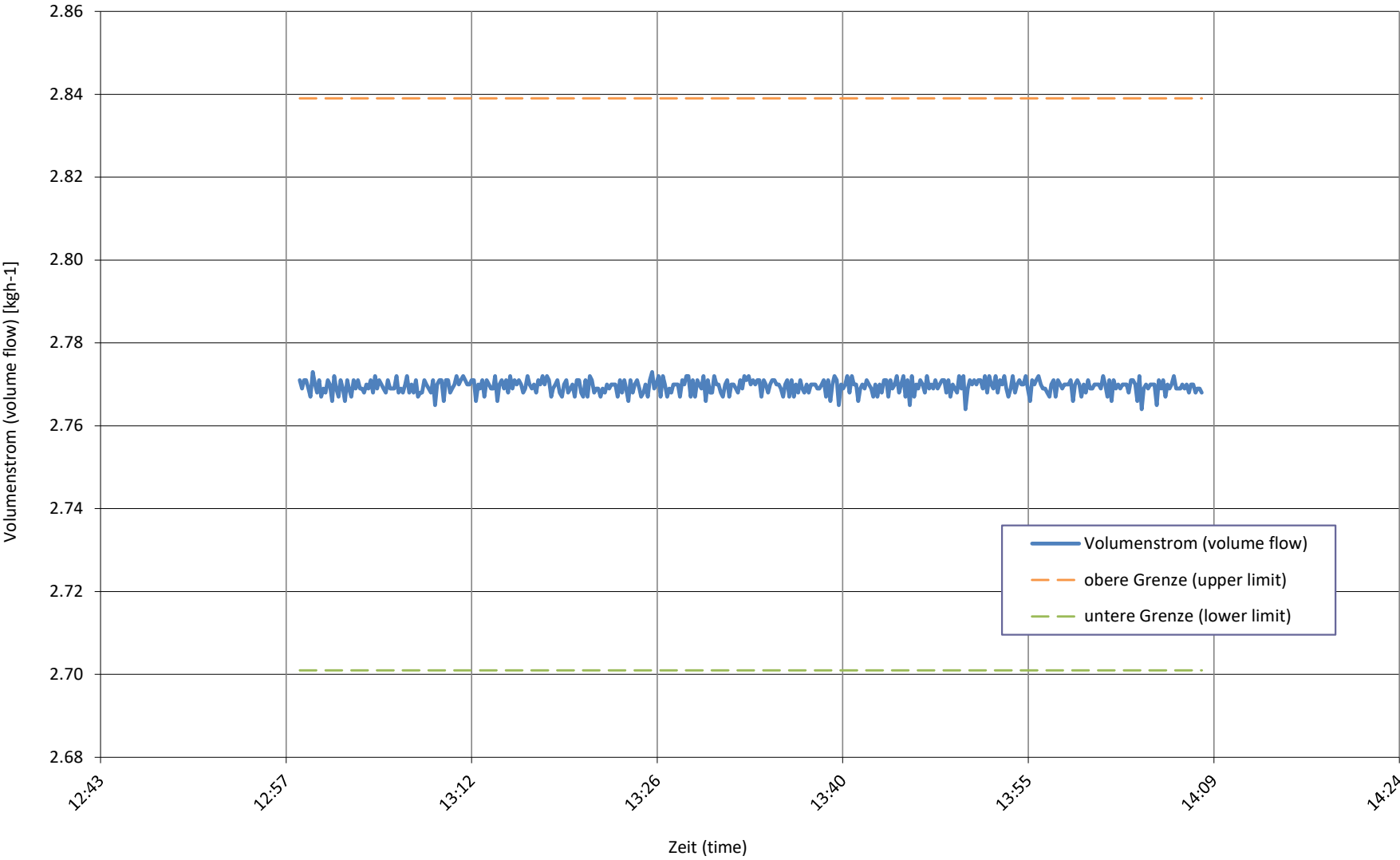
Senktemperatur bei
sink temperature at **A-10 / Wxx-35 E**



relative Luftfeuchtigkeit bei
relative humidity at **A-10 / Wxx-35 E**



Senkenmassenstrom bei
sink mass flow at **A-10 / Wxx-35 E**



Prüfbedingung
Test condition

A7 / W47-55

Prüfnummer
Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 13697 | ± 250 | ± 1.81% |
| a Heizleistung (heating capacity) | W | 13772 | ± 219 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 7.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | 4.77 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 87.1 | ± 2.3 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 46.99 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 55.01 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 1478.6 | ± 14.8 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -105.56 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggastemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgastemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 5255 | ± 68 | ± 1.29% |
| Wirkleistung (power input) | W | 5374 | ± 48 | |
| Spannung (voltage) | V | 233.4 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 7.84 | ± 0.05 | |
| Scheinleistung (apparent output) | VA | 5396 | ± 43 | |
| Leistungsfaktor cosp (power factor) | - | 0.996 | ± 0.001 | |
| 3 COP (COP) | - | 2.606 | ± 0.081 | ± 3.11% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 21.1 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 20:26:30 | 13.01.2025 | 2025-01-13 |
| Prüfende (end of test) | hh:mm:ss | 21:36:30 | 13.01.2025 | 2025-01-13 |

6 Bemerkung (remark)

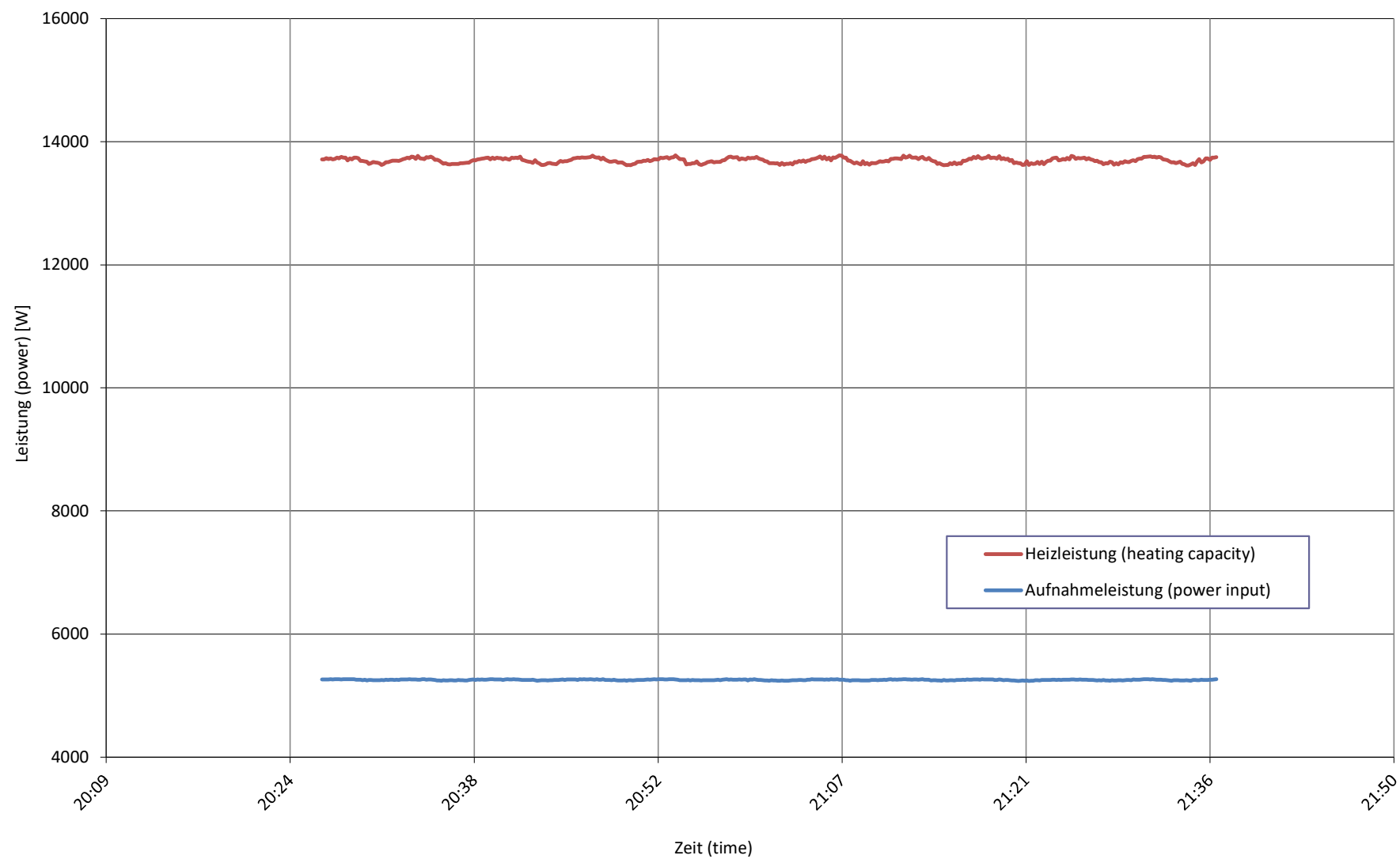
- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 64 rps
- Ventilatorumdrehzahl / fan speed = 780 rpm (Level 10)

7 Prüfer (supervisor) C. Schaible

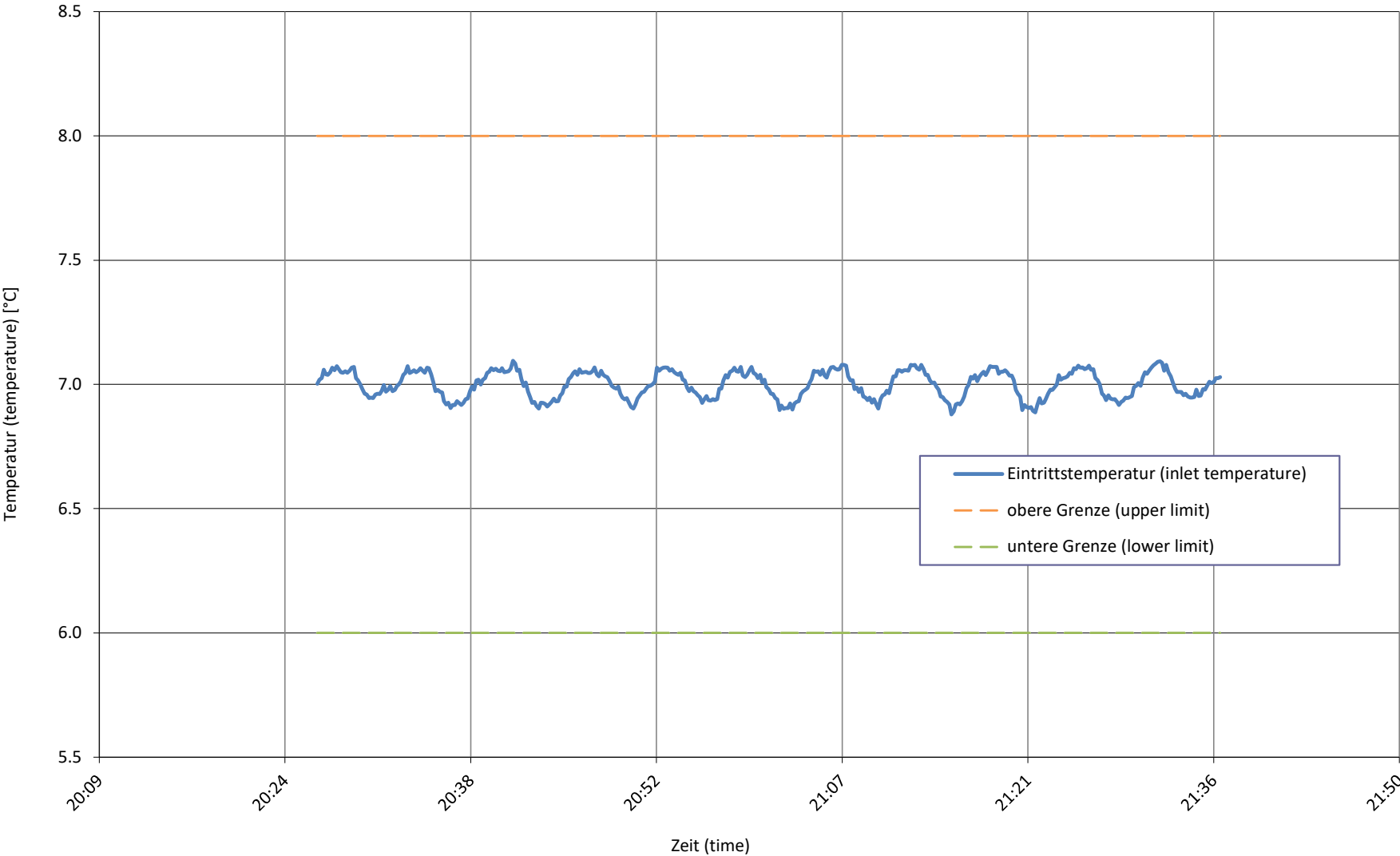
Prüfnorm (test standard)

EN 14511-2:2022
EN 14511-3:2022
EN 14825:2022

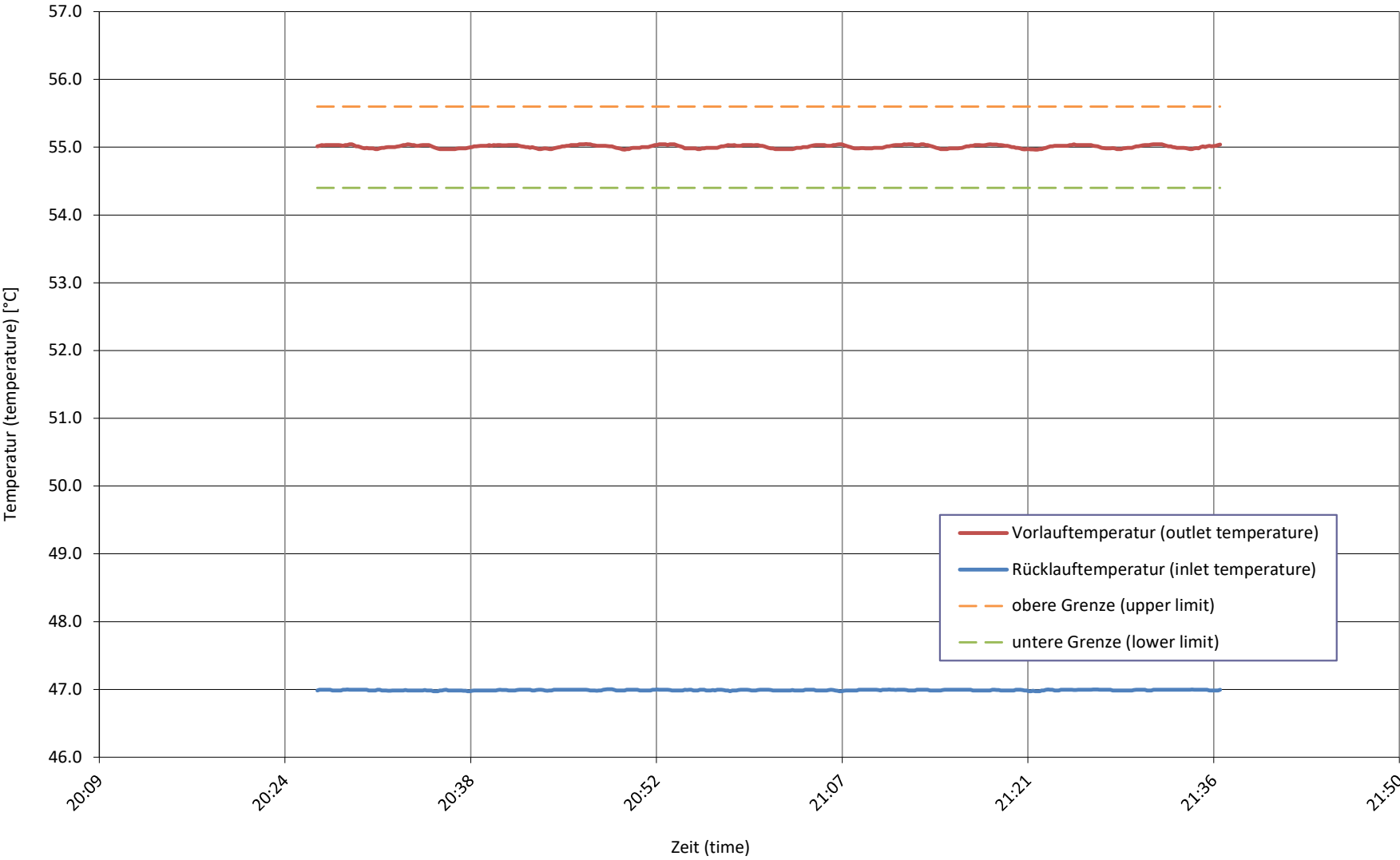
passed
passed
passed

Wärme- und Aufnahmeleistung bei
heating capacity and input power at**A7 / W47-55**

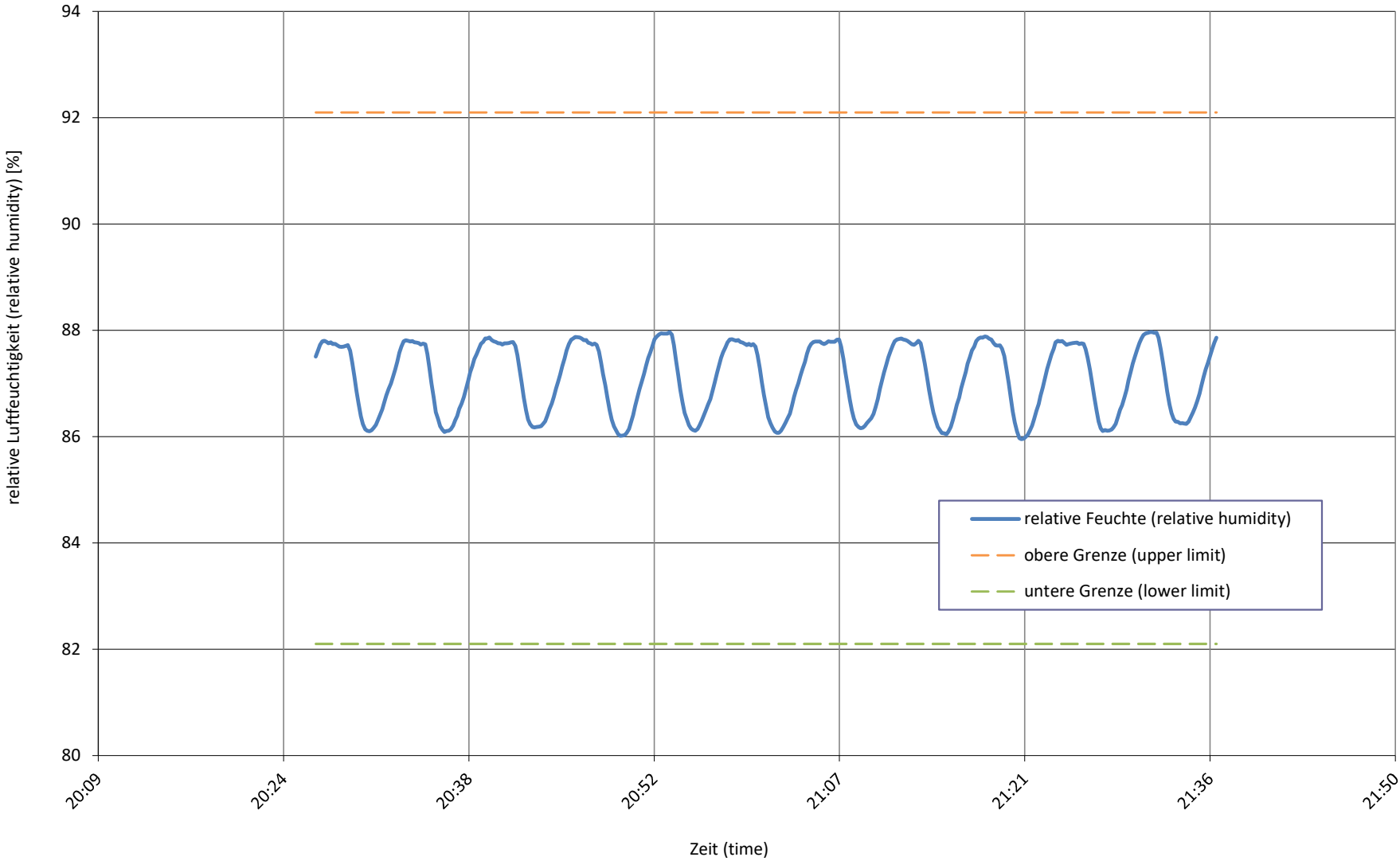
Quellentemperatur bei
source temperature at **A7 / W47-55**



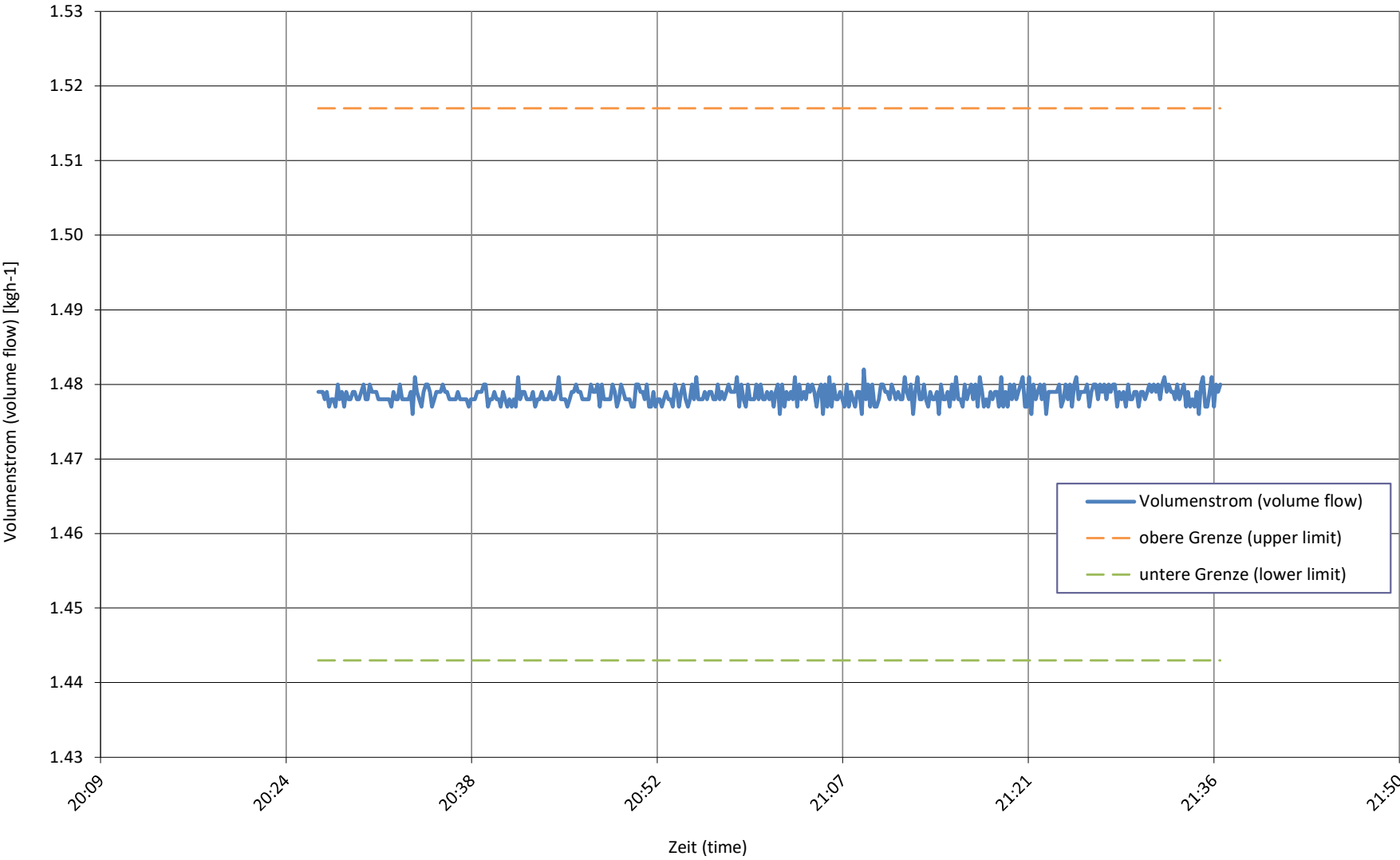
Senktemperatur bei
sink temperature at **A7 / W47-55**



relative Luftfeuchtigkeit bei
relative humidity at **A7 / W47-55**



Senkenmassenstrom bei
sink mass flow at **A7 / W47-55**



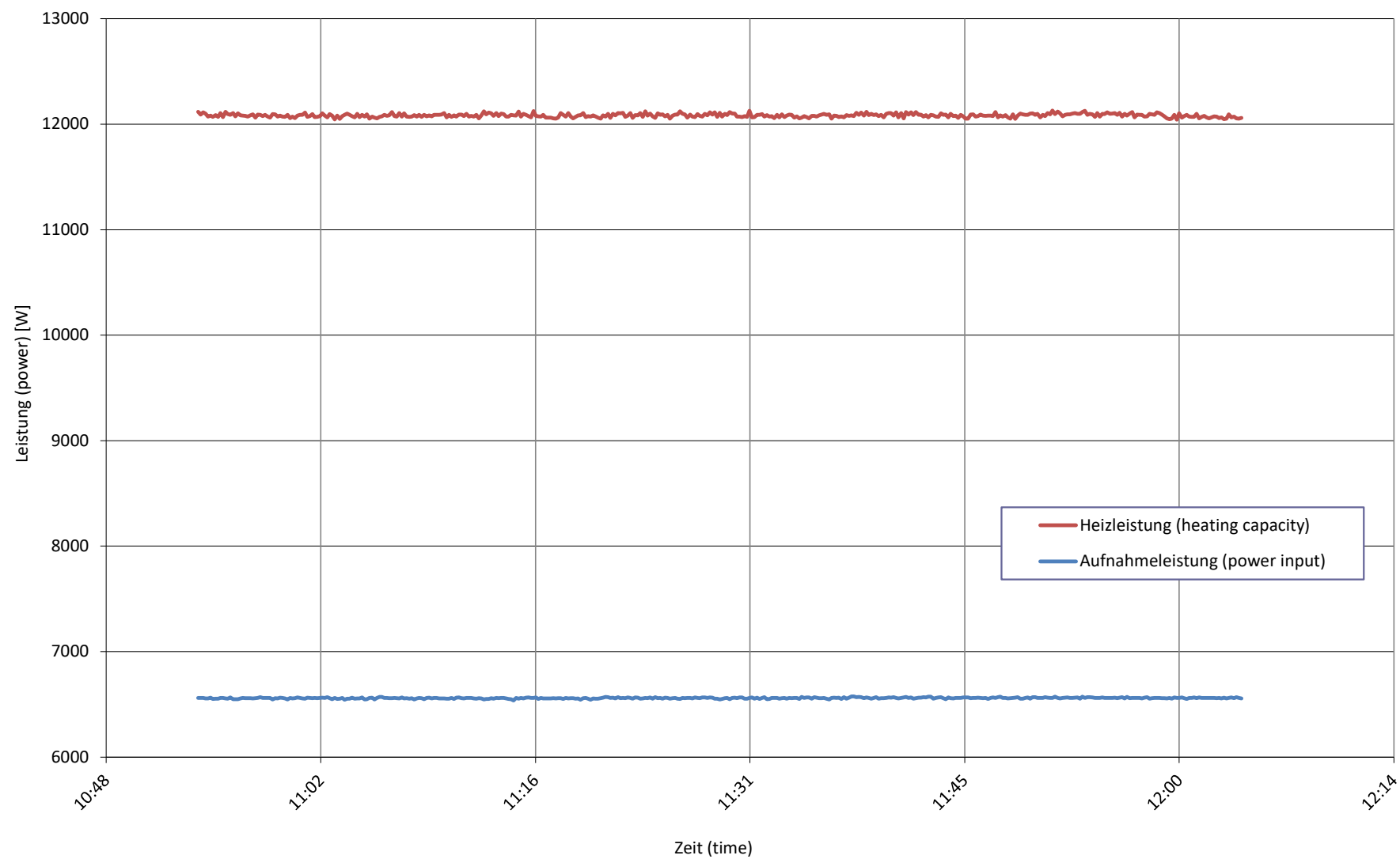
Prüfbedingung
Test condition

A-7 / Wxx-52 Tbiv

Prüfnummer
Test number

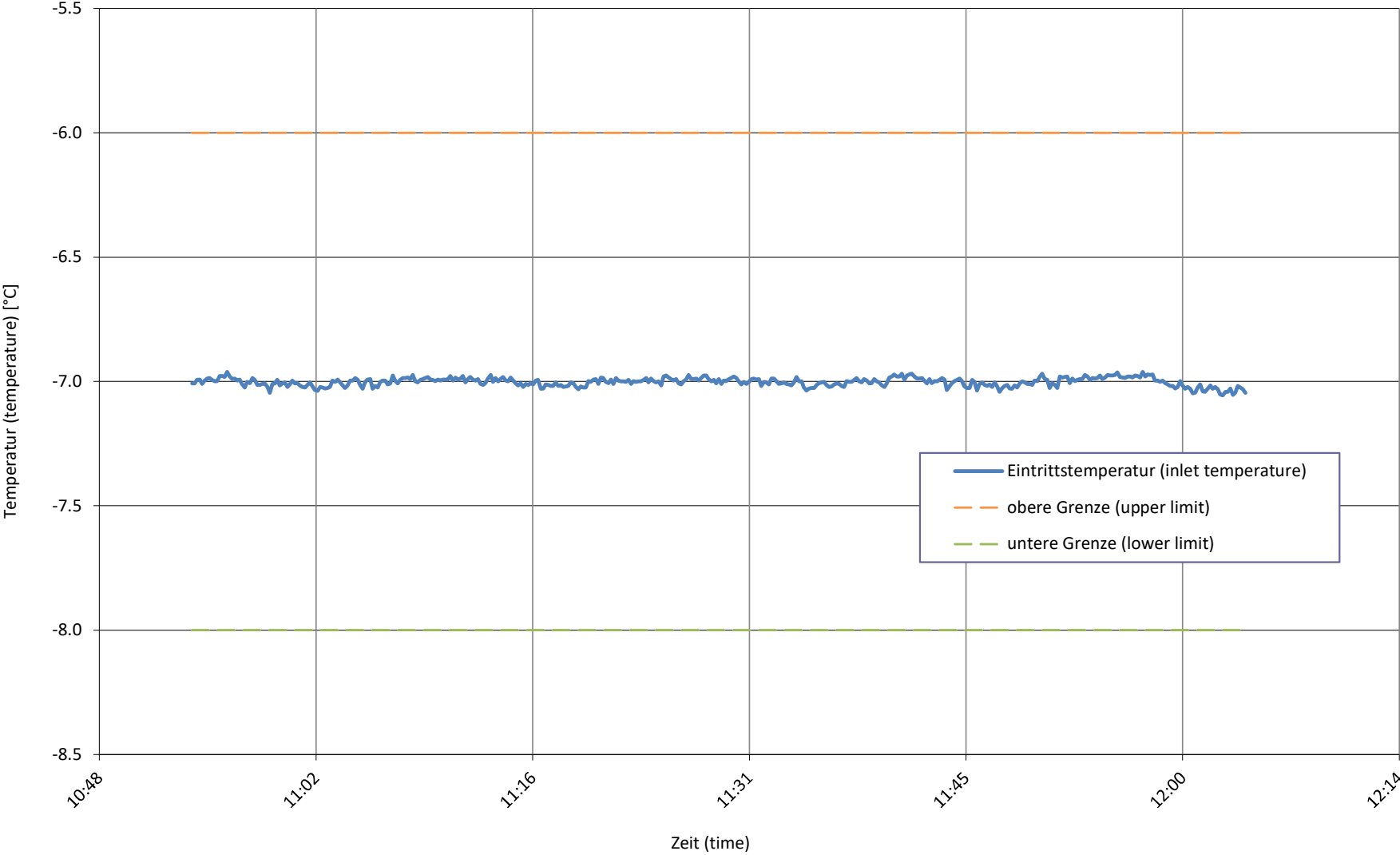
LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|---------------------------------|---|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 12083 | ± 241 | ± 1.98% |
| a Heizleistung (heating capacity) | W | 12161 | ± 209 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | -7.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | -8.06 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 71.8 | ± 2.9 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 44.91 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 51.99 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 1478.7 | ± 14.8 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -110.57 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggastemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgastemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 6560 | ± 80 | ± 1.23% |
| Wirkleistung (power input) | W | 6683 | ± 60 | |
| Spannung (voltage) | V | 233.5 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 9.81 | ± 0.06 | |
| Scheinleistung (apparent output) | VA | 6727 | ± 54 | |
| Leistungsfaktor cosp (power factor) | - | 0.994 | ± 0.001 | |
| 3 COP (COP) | - | 1.842 | ± 0.059 | ± 3.21% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 21.3 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 10:54:10 | 16.01.2025 | 2025-01-16 |
| Prüfende (end of test) | hh:mm:ss | 12:04:10 | 16.01.2025 | 2025-01-16 |
| 6 Bemerkung (remark) - Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump - Kompressorfrequenz / compressor speed = 90 rps - Ventilatorumdrehzahl / fan speed = 780 rpm (Level 10) | | | | |
| 7 Prüfer (supervisor) C. Schaible | Prüfnorm (test standard) | EN 14511-2:2022 EN 14511-3:2022 EN 14825:2022 | passed passed passed | |

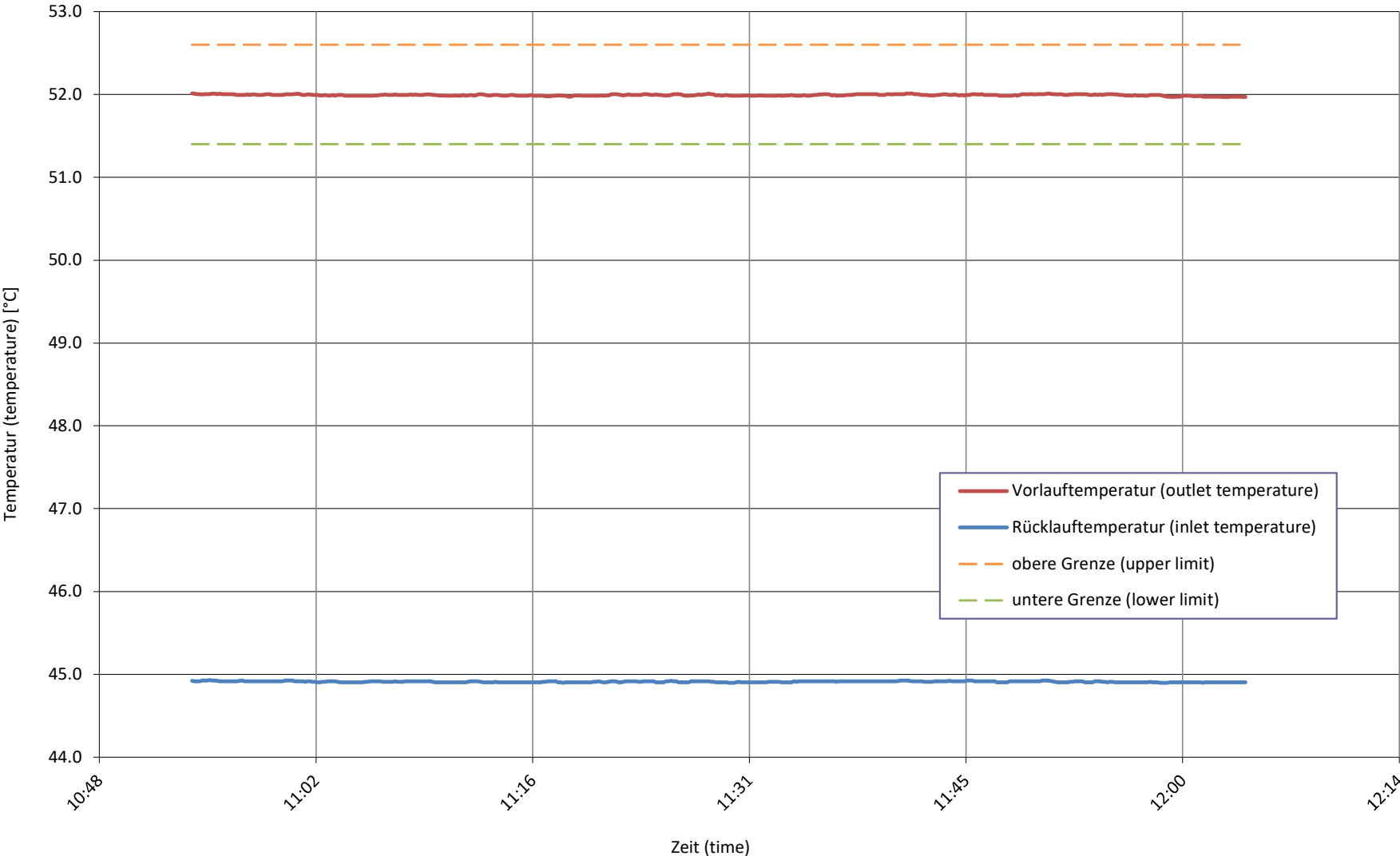
Wärme- und Aufnahmeleistung bei
heating capacity and input power at**A-7 / Wxx-52 Tbiv**

Quellentemperatur bei
source temperature at

A-7 / Wxx-52 Tbiv

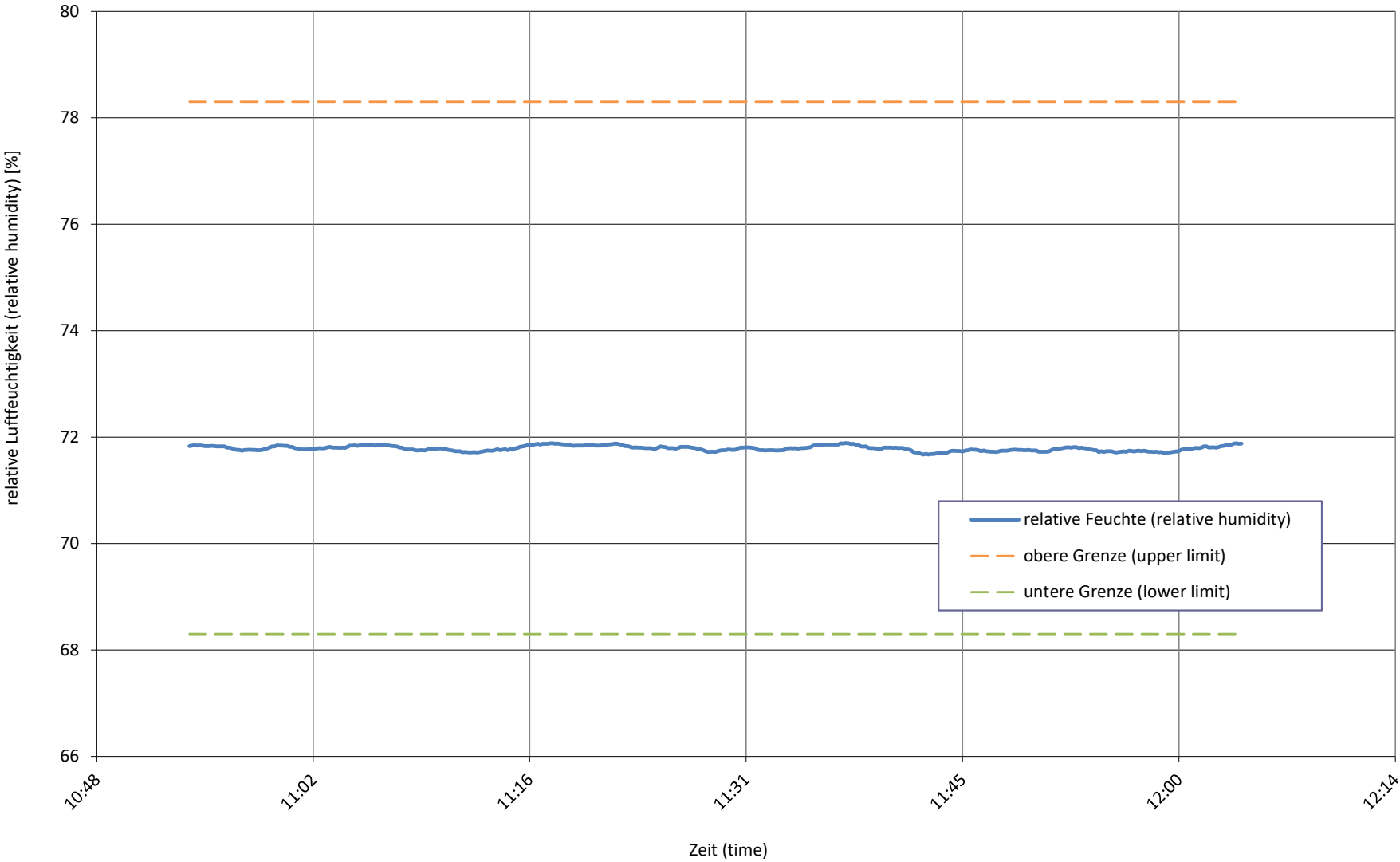


Senktemperatur bei
sink temperature at **A-7 / Wxx-52 Tbiv**



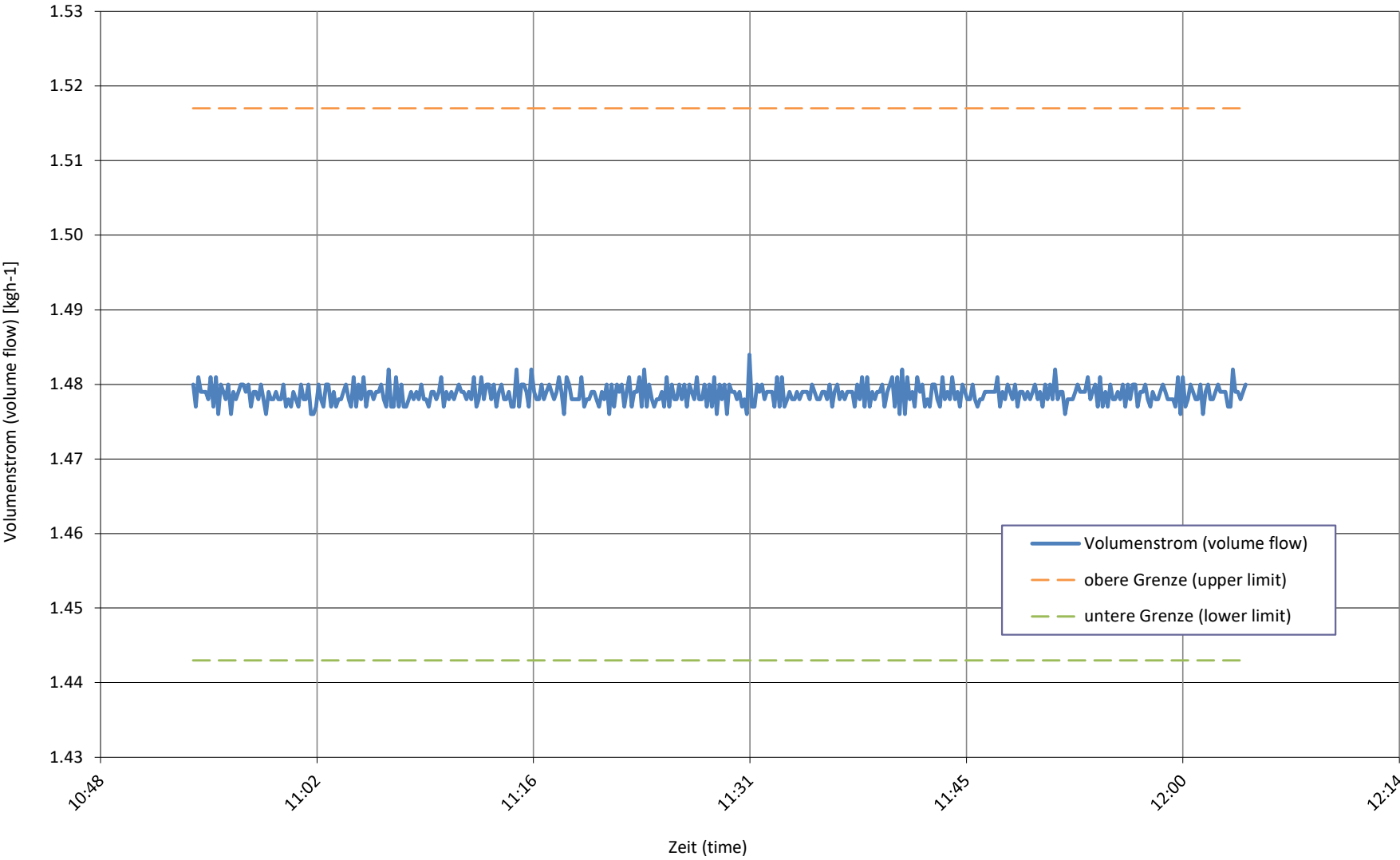
relative Luftfeuchtigkeit bei
relative humidity at

A-7 / Wxx-52 Tbiv



Senkenmassenstrom bei
sink mass flow at

A-7 / Wxx-52 Tbiv



Prüfbedingung
 Test condition

A2 / Wxx-42 B

 Prüfnummer
 Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 7316 | ± 216 | ± 2.93% |
| a Heizleistung (heating capacity) | W | 7392 | ± 185 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 2.01 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | -0.14 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 84.8 | ± 3.4 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 37.71 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 42.02 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 1478.4 | ± 14.8 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -106.57 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggasttemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgasttemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 2273 | ± 41 | ± 1.82% |
| Wirkleistung (power input) | W | 2393 | ± 22 | |
| Spannung (voltage) | V | 233.3 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 3.47 | ± 0.02 | |
| Scheinleistung (apparent output) | VA | 2408 | ± 19 | |
| Leistungsfaktor cosp (power factor) | - | 0.993 | ± 0.001 | |
| 3 COP (COP) | - | 3.218 | ± 0.153 | ± 4.74% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 20.9 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 09:31:10 | 20.01.2025 | 2025-01-20 |
| Prüfende (end of test) | hh:mm:ss | 10:41:10 | 20.01.2025 | 2025-01-20 |

6 Bemerkung (remark)

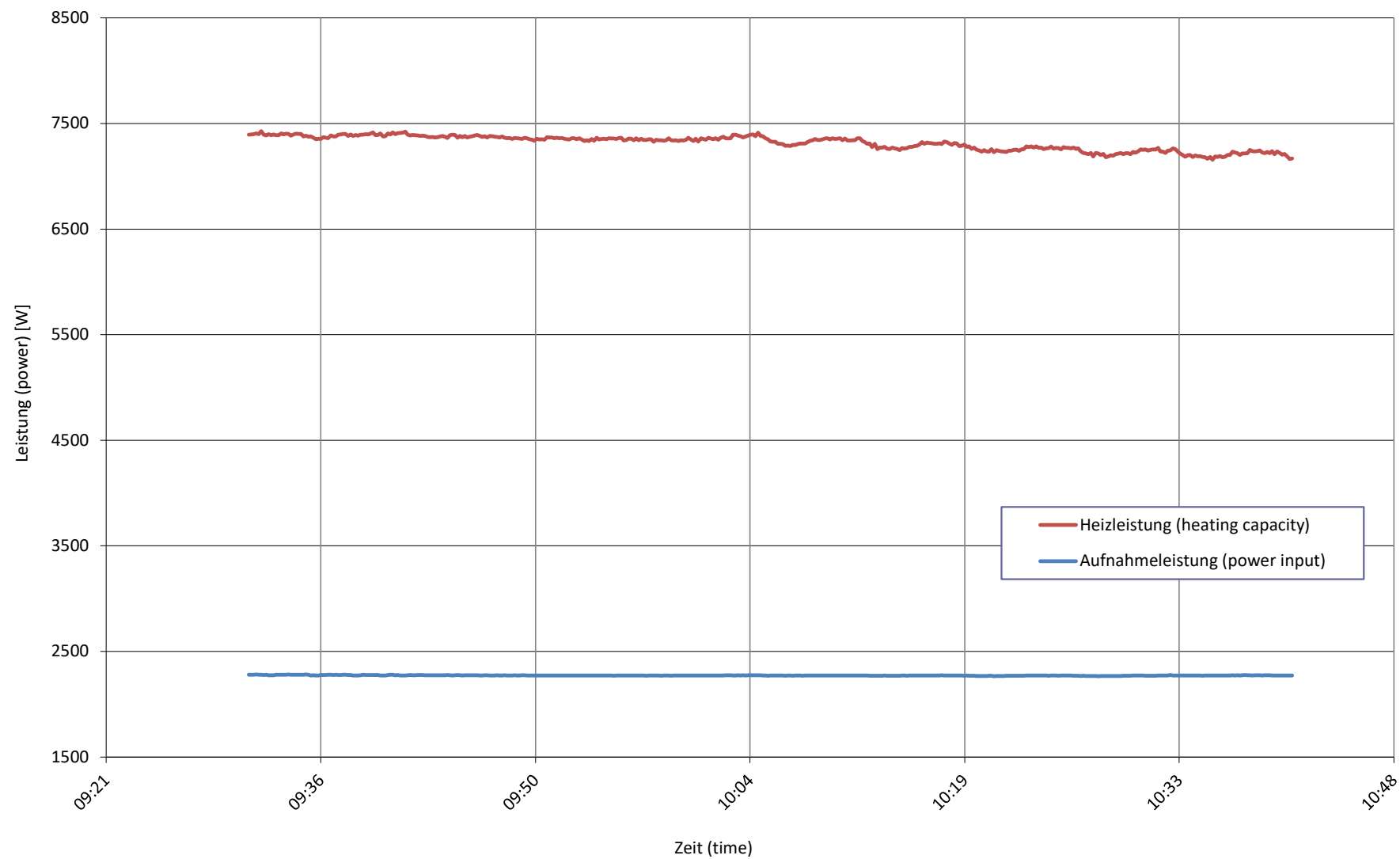
- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 37 rps
- Ventilatorumdrehzahl / fan speed = 600 rpm (Level 8)
- LEVa = 95 pls

7 Prüfer (supervisor) C. Schaible

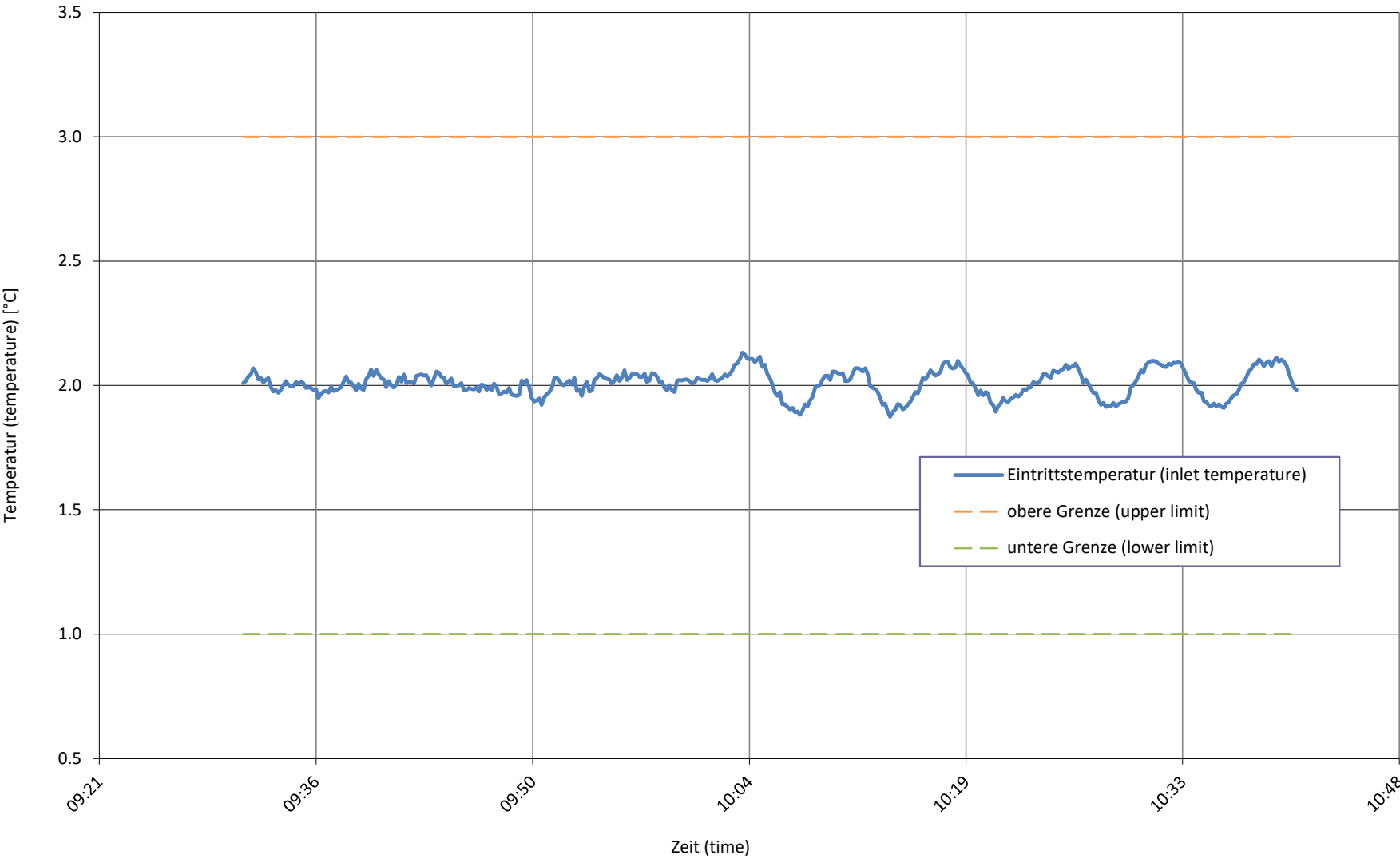
Prüfnorm (test standard)

 EN 14511-2:2022
 EN 14511-3:2022
 EN 14825:2022

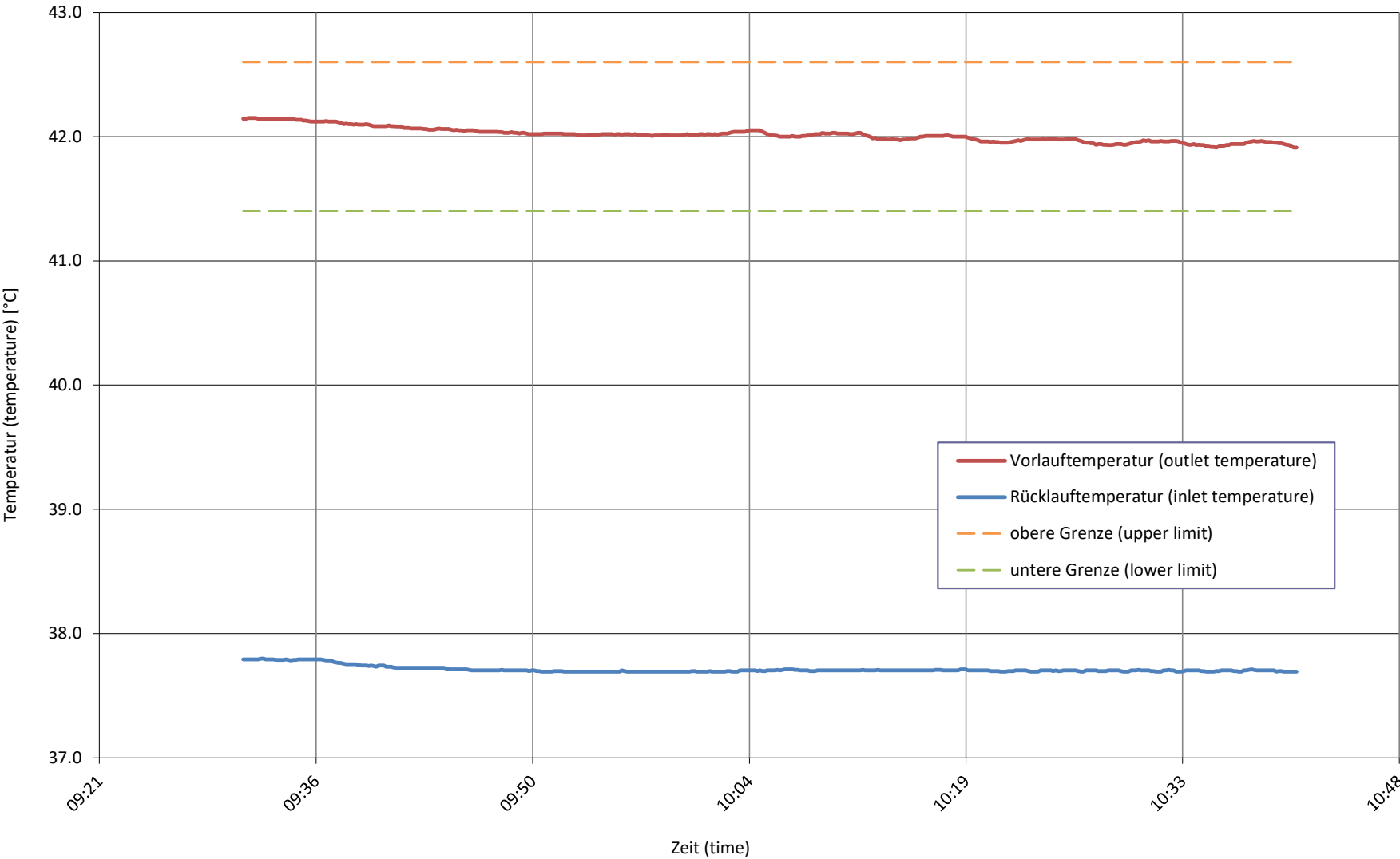
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Wärme- und Aufnahmeleistung bei
heating capacity and input power at**A2 / Wxx-42 B**

Quellentemperatur bei
source temperature at **A2 / Wxx-42 B**

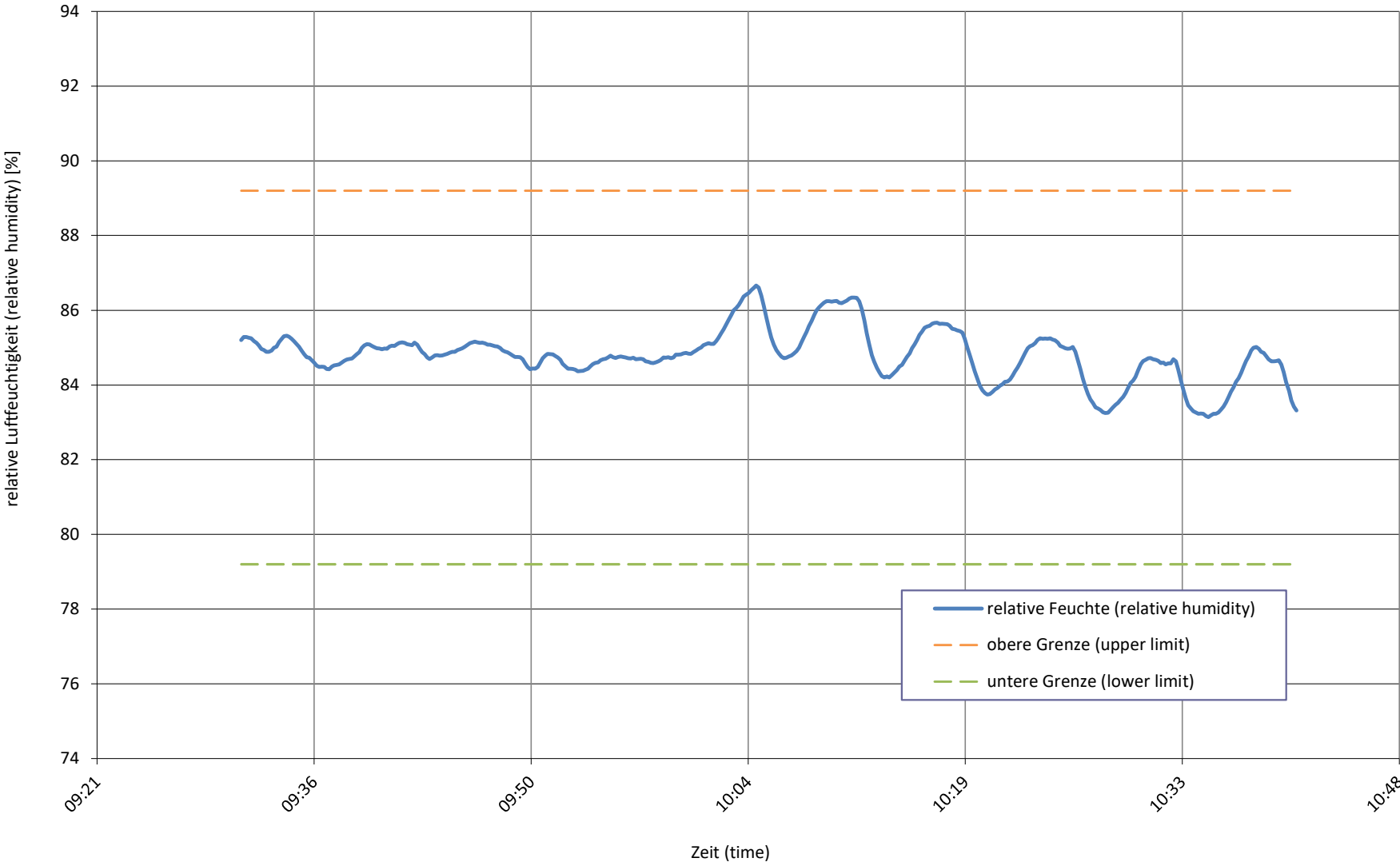


Senktemperatur bei
sink temperature at **A2 / Wxx-42 B**



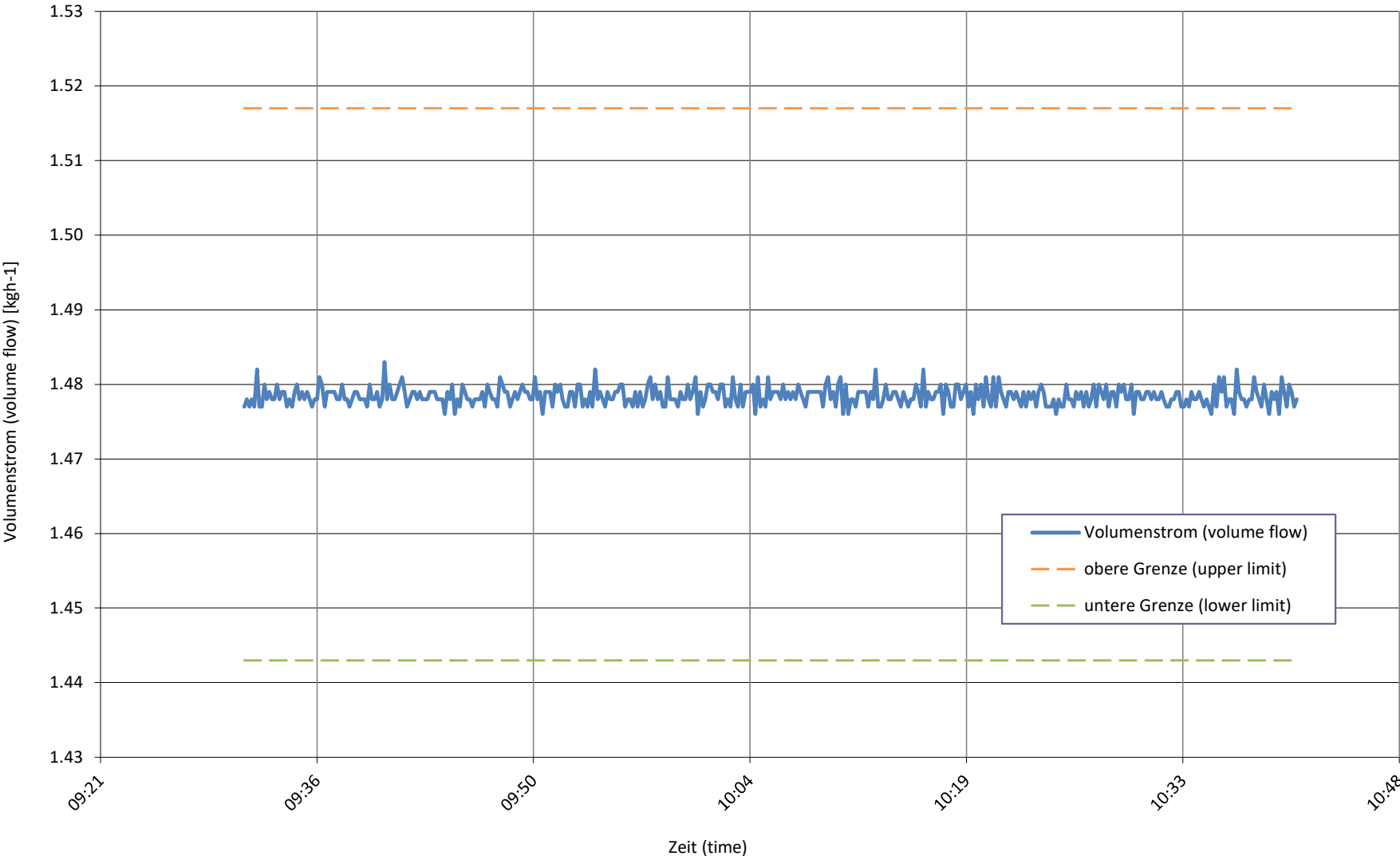
relative Luftfeuchtigkeit bei
relative humidity at

A2 / Wxx-42 B



Senkenmassenstrom bei
sink mass flow at

A2 / Wxx-42 B



Prüfbedingung
 Test condition

A7 / Wxx-36 C

 Prüfnummer
 Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 5103 | ± 209 | ± 4.03% |
| a Heizleistung (heating capacity) | W | 5179 | ± 178 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 7.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | 4.57 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 87.1 | ± 3.5 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 32.99 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 36.00 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 1478.7 | ± 14.8 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -106.51 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggasttemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgasttemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 1149 | ± 31 | ± 2.71% |
| Wirkleistung (power input) | W | 1269 | ± 11 | |
| Spannung (voltage) | V | 233.1 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 1.88 | ± 0.01 | |
| Scheinleistung (apparent output) | VA | 1304 | ± 10 | |
| Leistungsfaktor cosp (power factor) | - | 0.973 | ± 0.001 | |
| 3 COP (COP) | - | 4.441 | ± 0.299 | ± 6.74% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 20.7 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 23:18:00 | 21.01.2025 | 2025-01-21 |
| Prüfende (end of test) | hh:mm:ss | 00:28:00 | 22.01.2025 | 2025-01-22 |

6 Bemerkung (remark)

- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 22 rps
- Ventilatorumdrehzahl / fan speed = 320 rpm (Level 5)
- LEVa = 75 pls

7 Prüfer (supervisor) C. Schaible

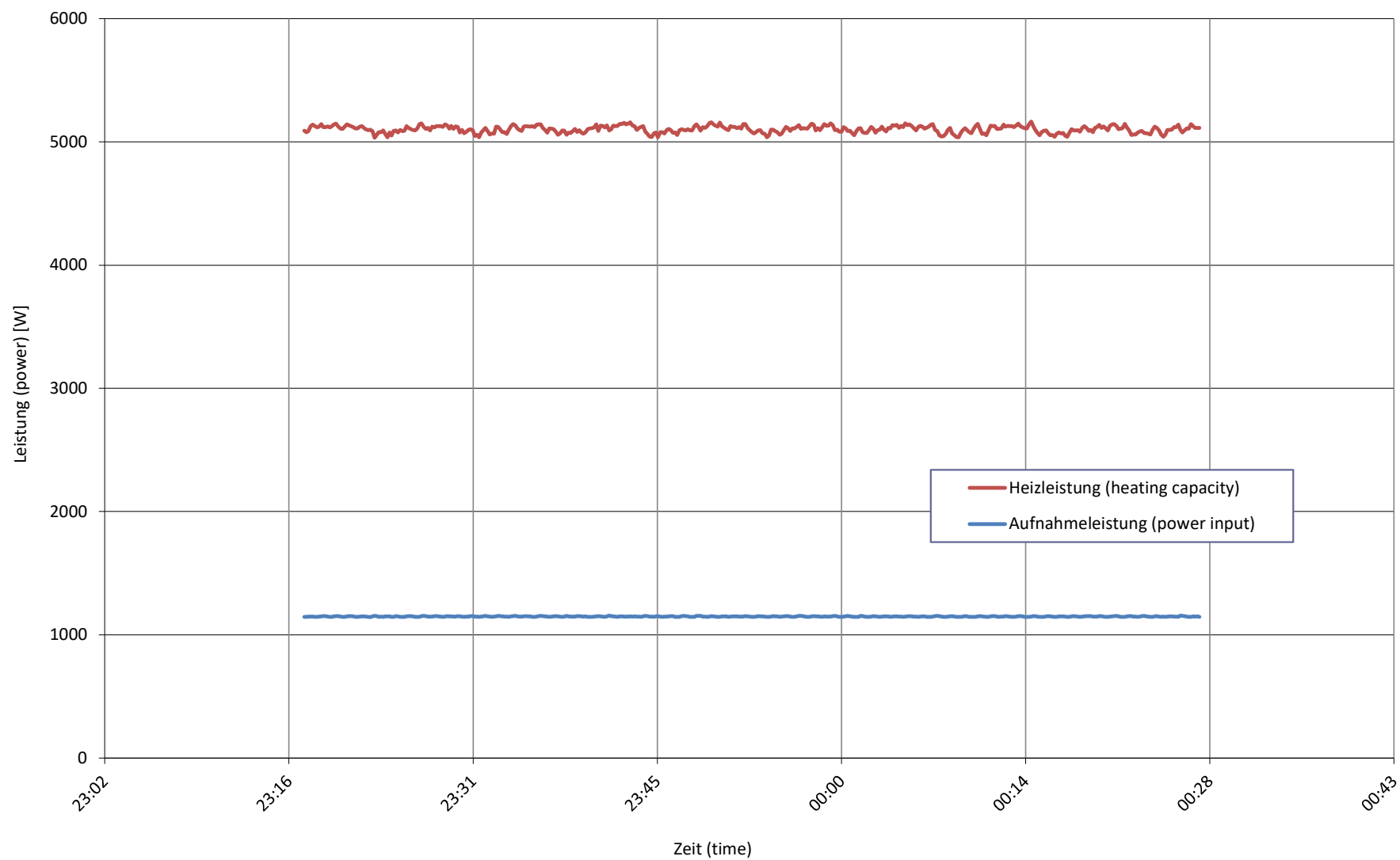
Prüfnorm (test standard)

 EN 14511-2:2022
 EN 14511-3:2022
 EN 14825:2022

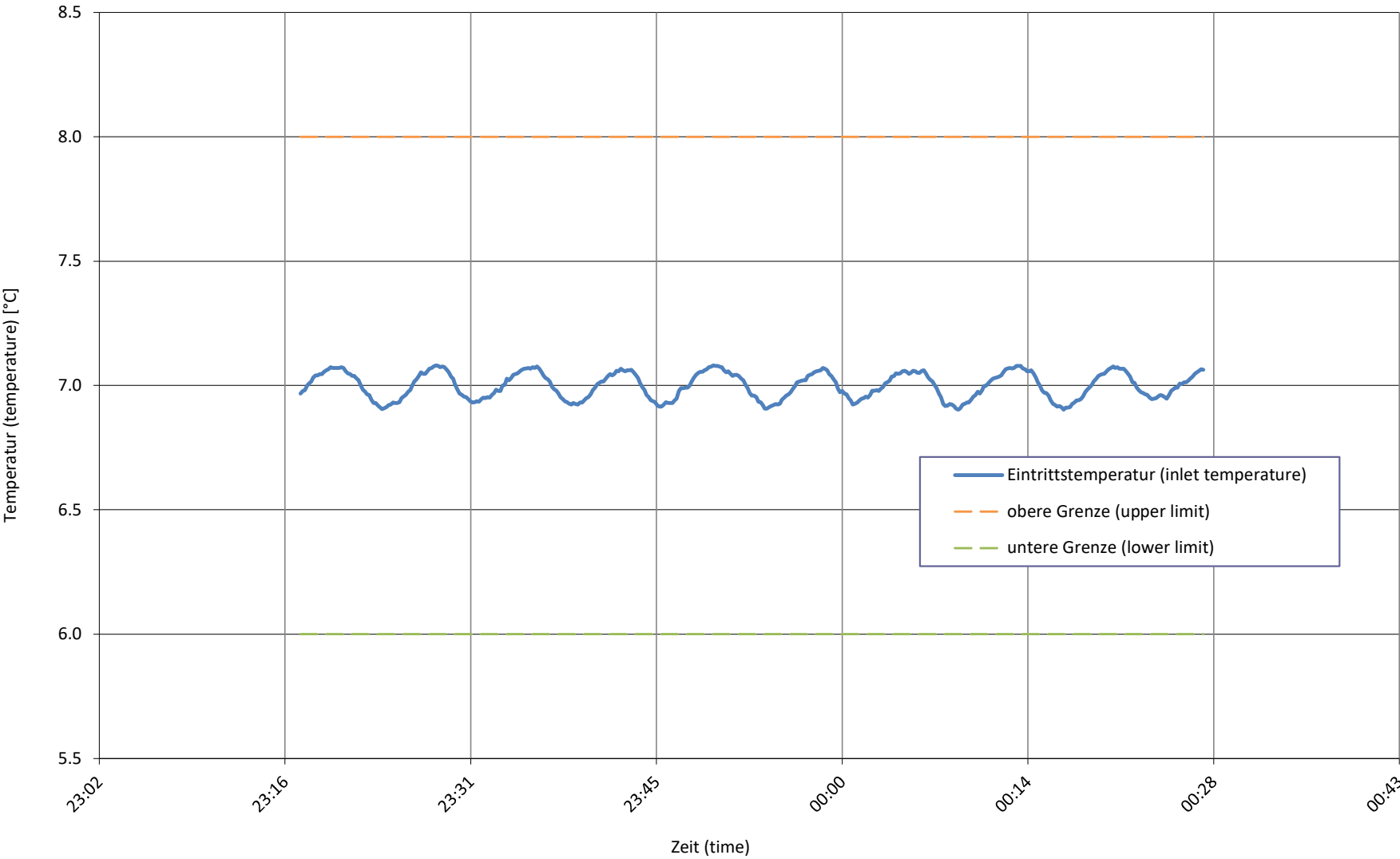
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Wärme- und Aufnahmeleistung bei
heating capacity and input power at

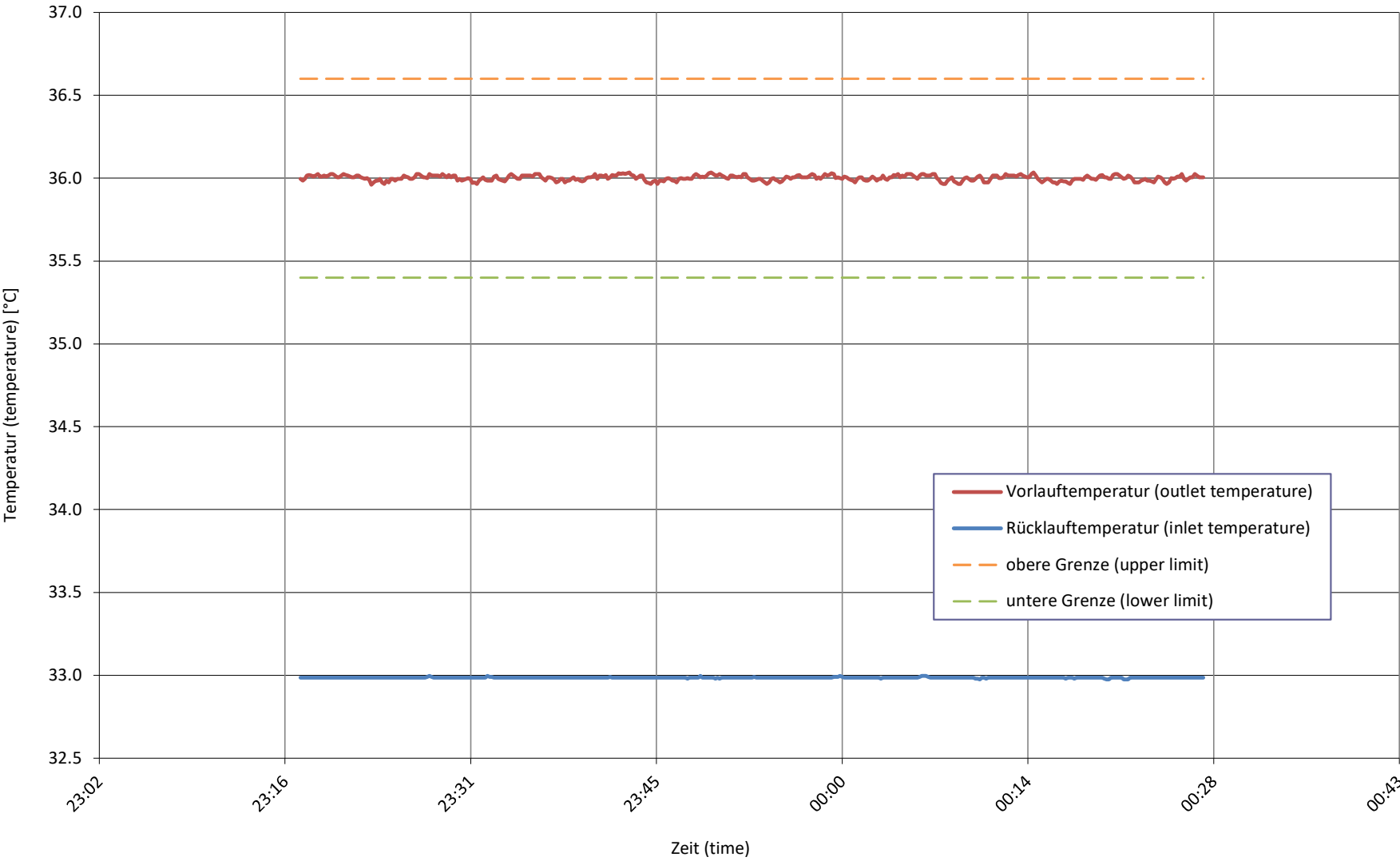
A7 / Wxx-36 C



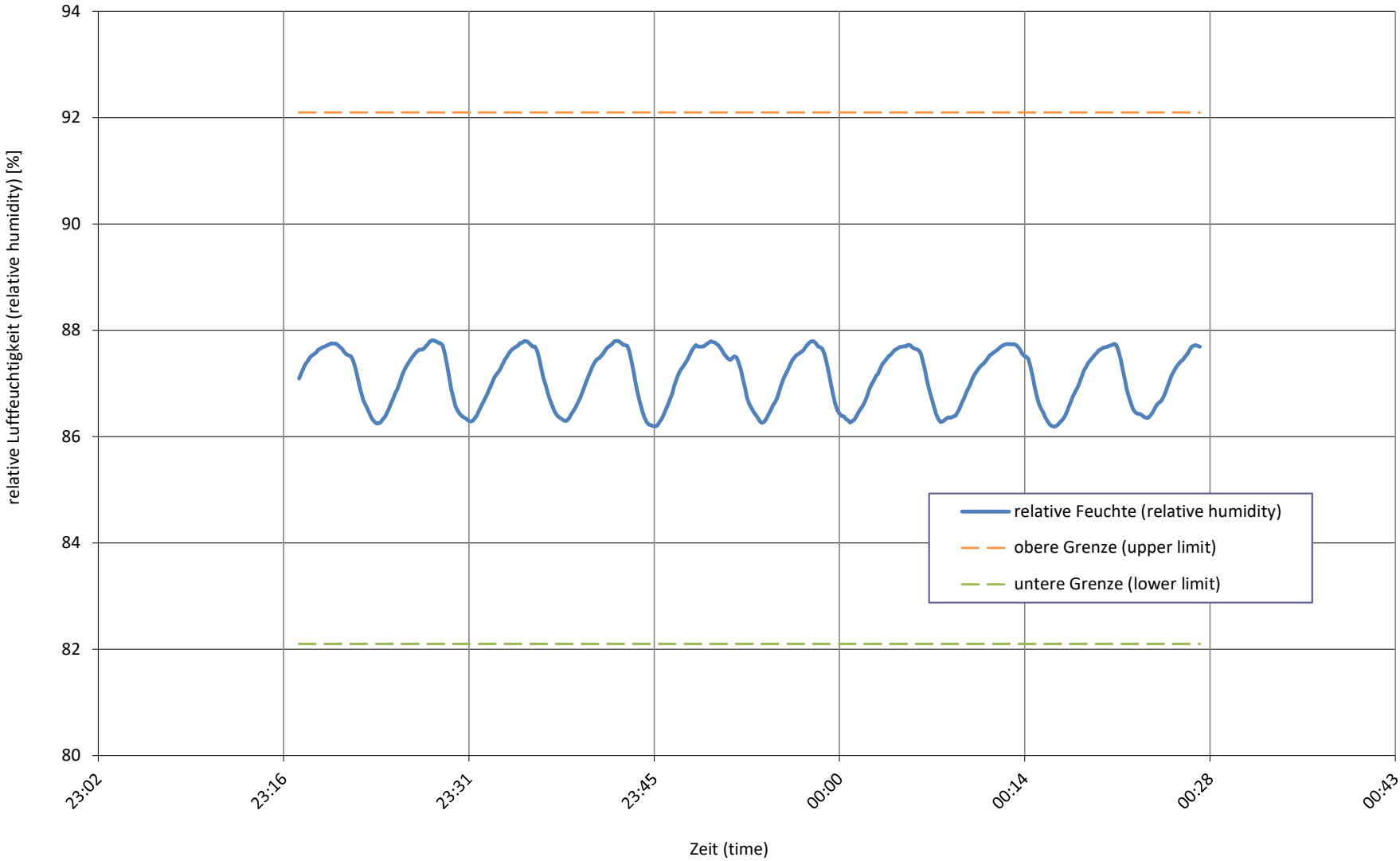
Quellentemperatur bei
source temperature at **A7 / Wxx-36 C**



Senktemperatur bei
sink temperature at **A7 / Wxx-36 C**

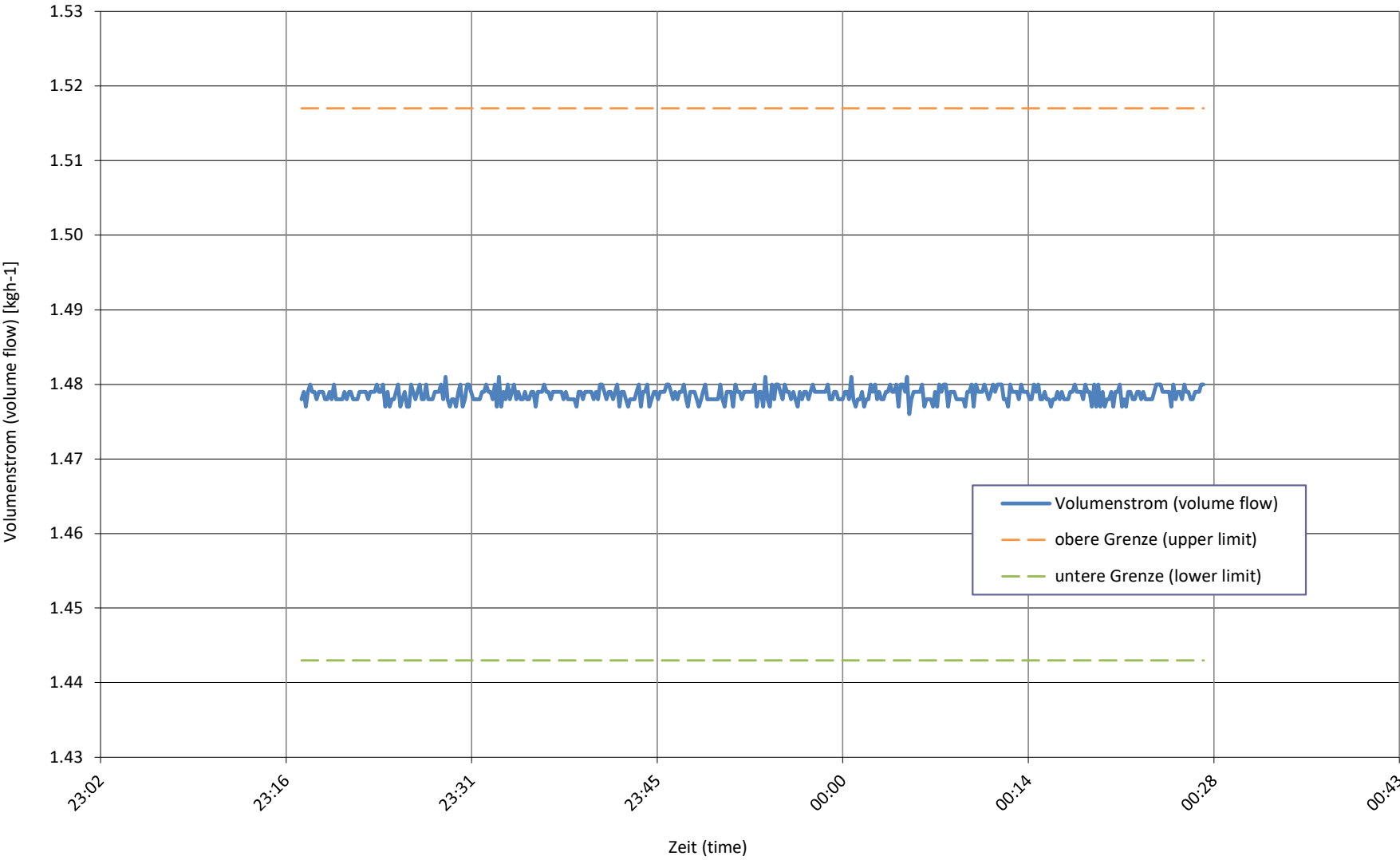


relative Luftfeuchtigkeit bei
relative humidity at **A7 / Wxx-36 C**



Senkenmassenstrom bei
sink mass flow at

A7 / Wxx-36 C



Prüfbedingung
Test condition

A12 / Wxx-30 D

Prüfnummer
Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 5457 | ± 210 | ± 3.79% |
| a Heizleistung (heating capacity) | W | 5533 | ± 179 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 11.90 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | 9.42 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 89.1 | ± 2.4 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 28.70 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 31.92 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 1478.8 | ± 14.8 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -106.58 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggastemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgastemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 877 | ± 28 | ± 3.25% |
| Wirkleistung (power input) | W | 996 | ± 9 | |
| Spannung (voltage) | V | 231.0 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 1.87 | ± 0.01 | |
| Scheinleistung (apparent output) | VA | 1288 | ± 10 | |
| Leistungsfaktor cosp (power factor) | - | 0.774 | ± 0.001 | |
| 3 COP (COP) | - | 6.226 | ± 0.438 | ± 7.04% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 21.1 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 13:25:20 | 22.01.2025 | 2025-01-22 |
| Prüfende (end of test) | hh:mm:ss | 14:35:20 | 22.01.2025 | 2025-01-22 |

6 Bemerkung (remark)

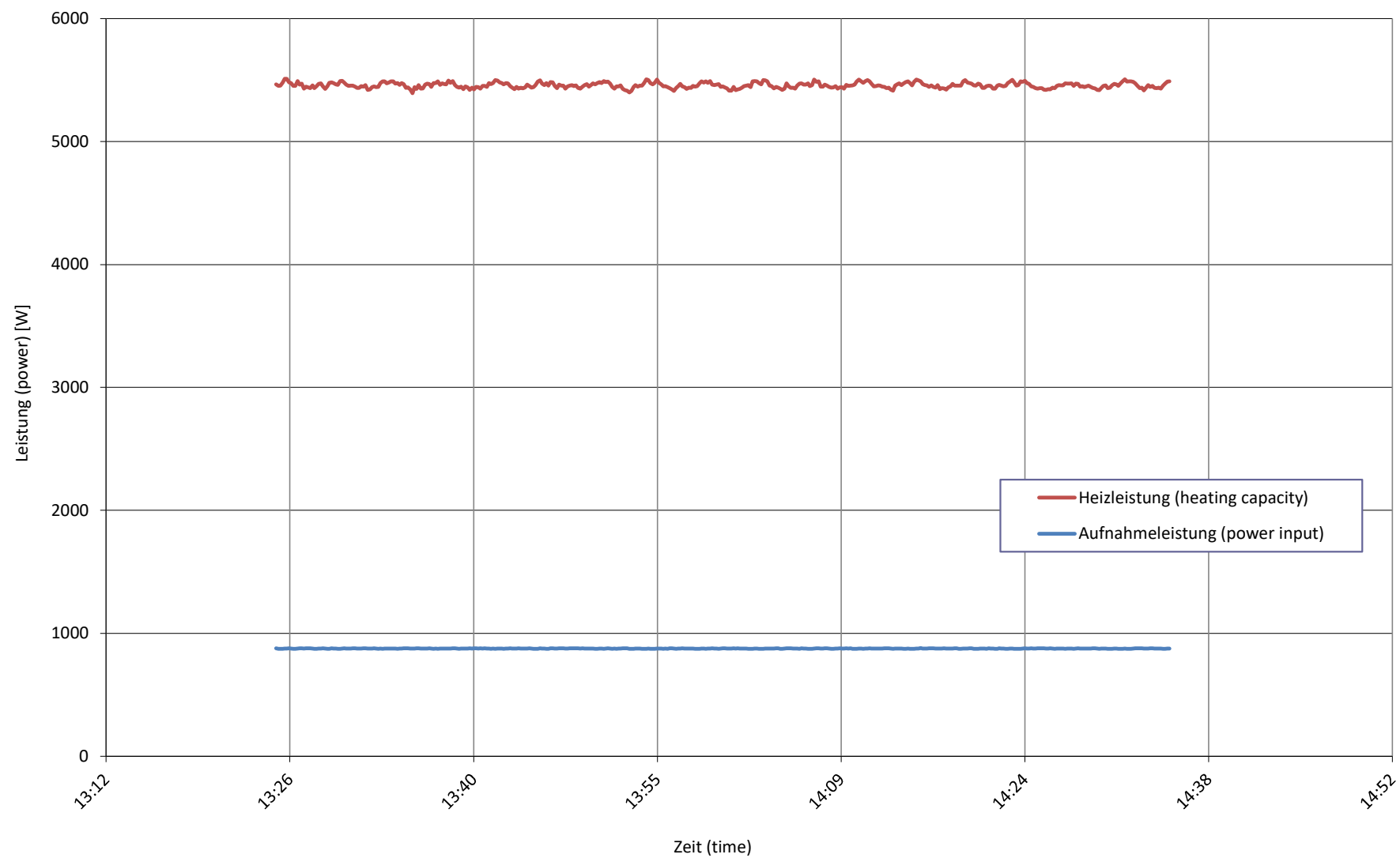
- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 20 rps
- Ventilatorumdrehzahl / fan speed = 320 rpm (Level 5)
- LEVa = 85 pls

7 Prüfer (supervisor) C. Schaible

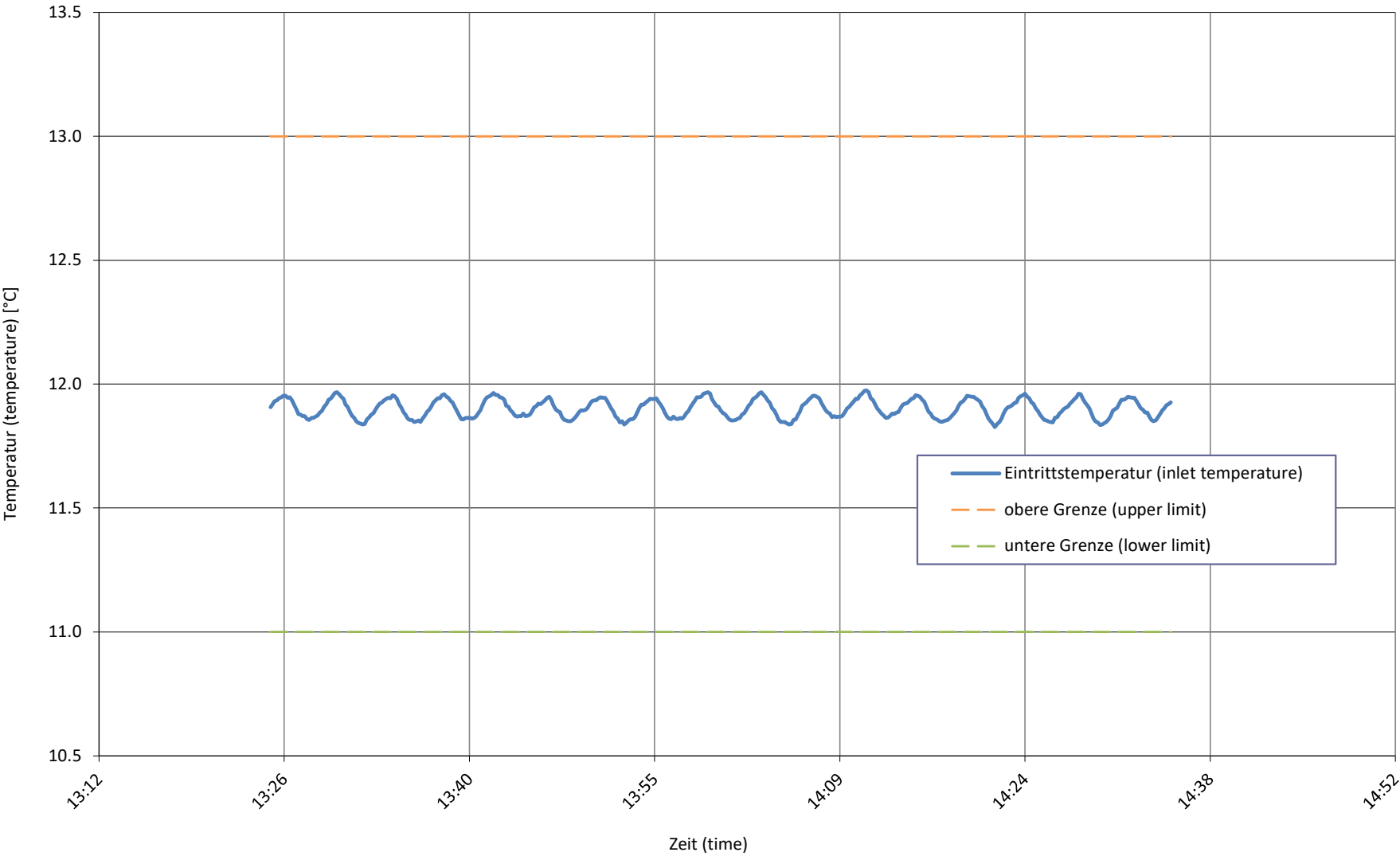
Prüfnorm (test standard)

EN 14511-2:2022
EN 14511-3:2022
EN 14825:2022

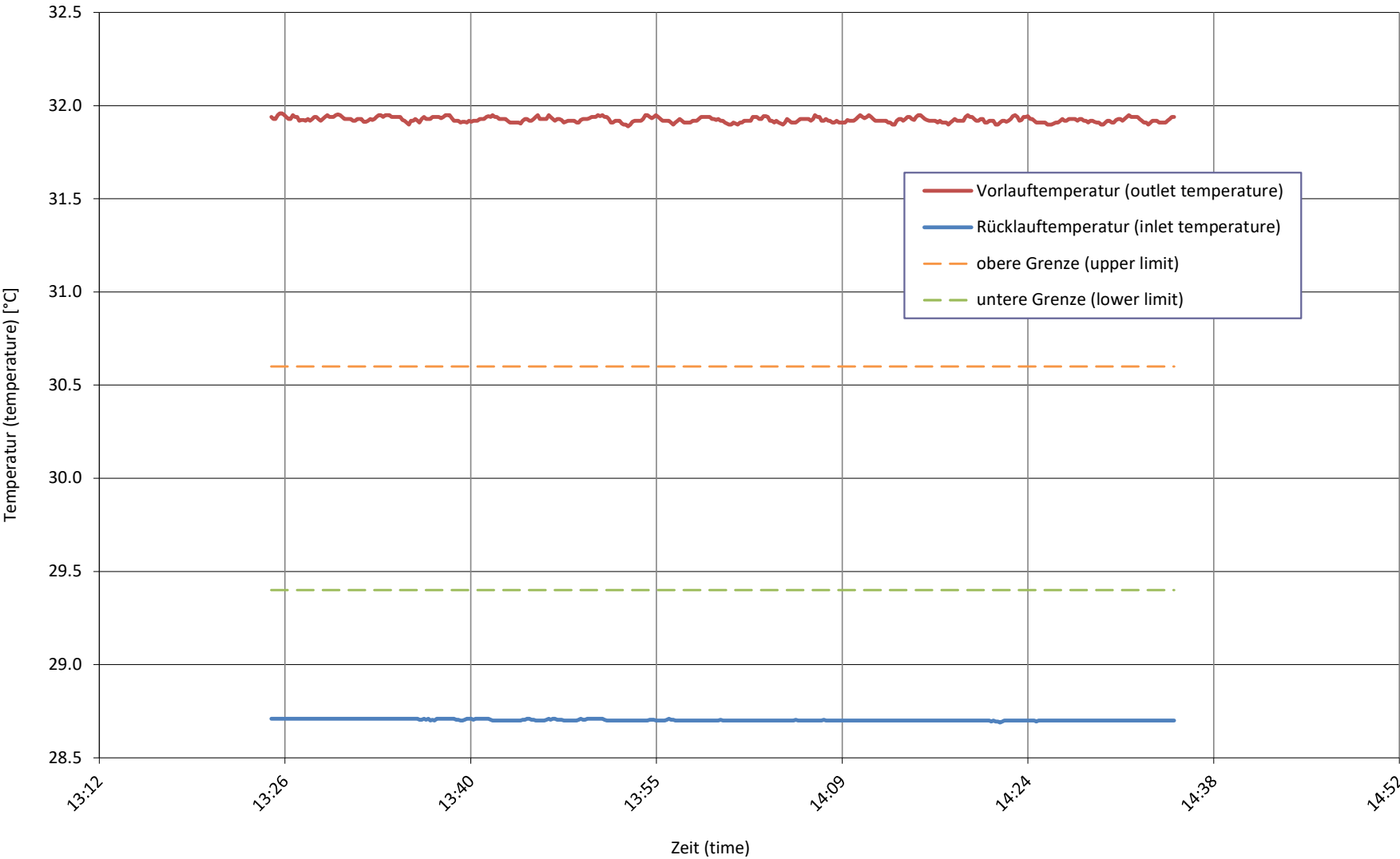
passed
passed
passed

Wärme- und Aufnahmeleistung bei
heating capacity and input power at**A12 / Wxx-30 D**

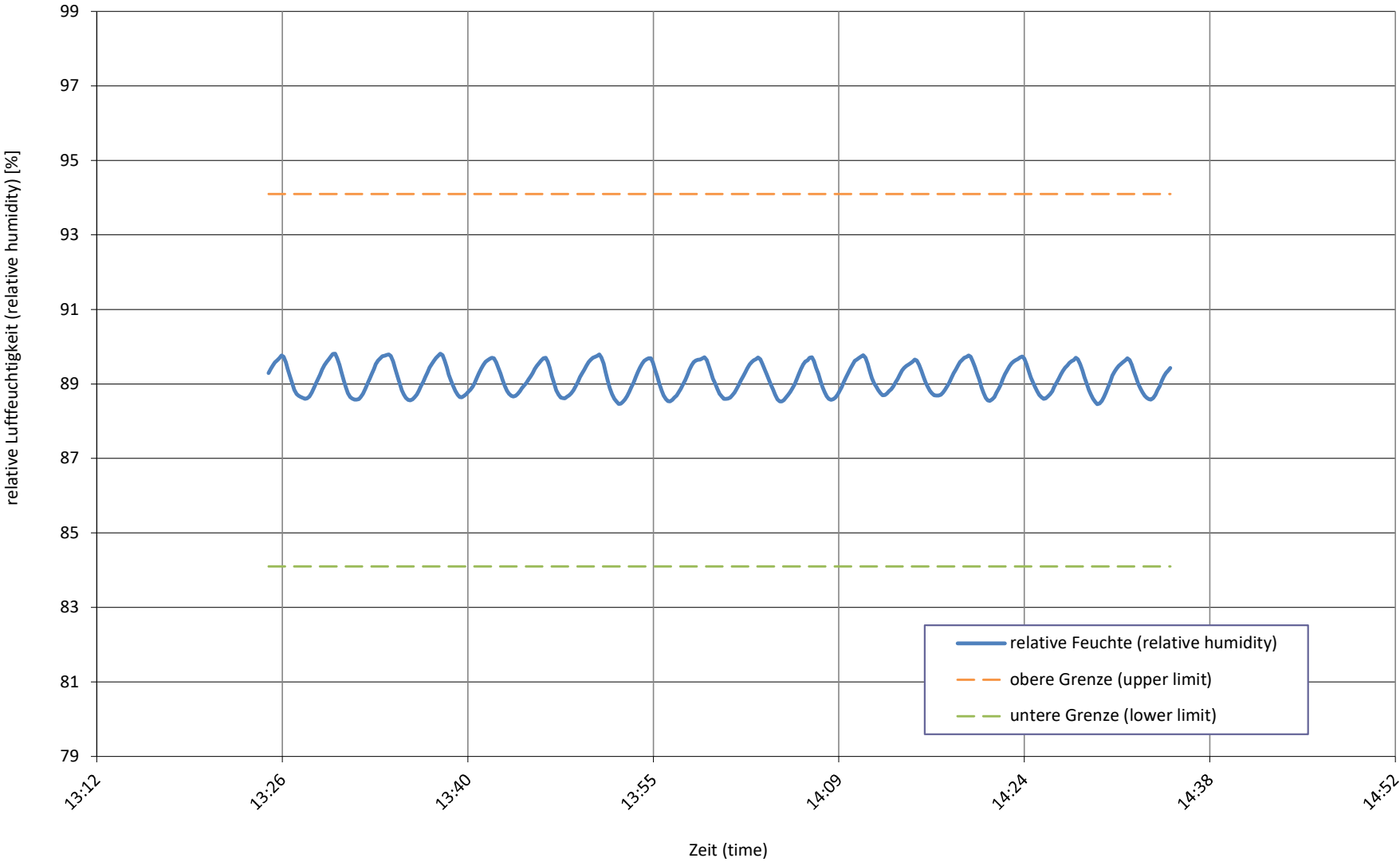
Quellentemperatur bei
source temperature at **A12 / Wxx-30 D**



Senktemperatur bei
sink temperature at **A12 / Wxx-30 D**

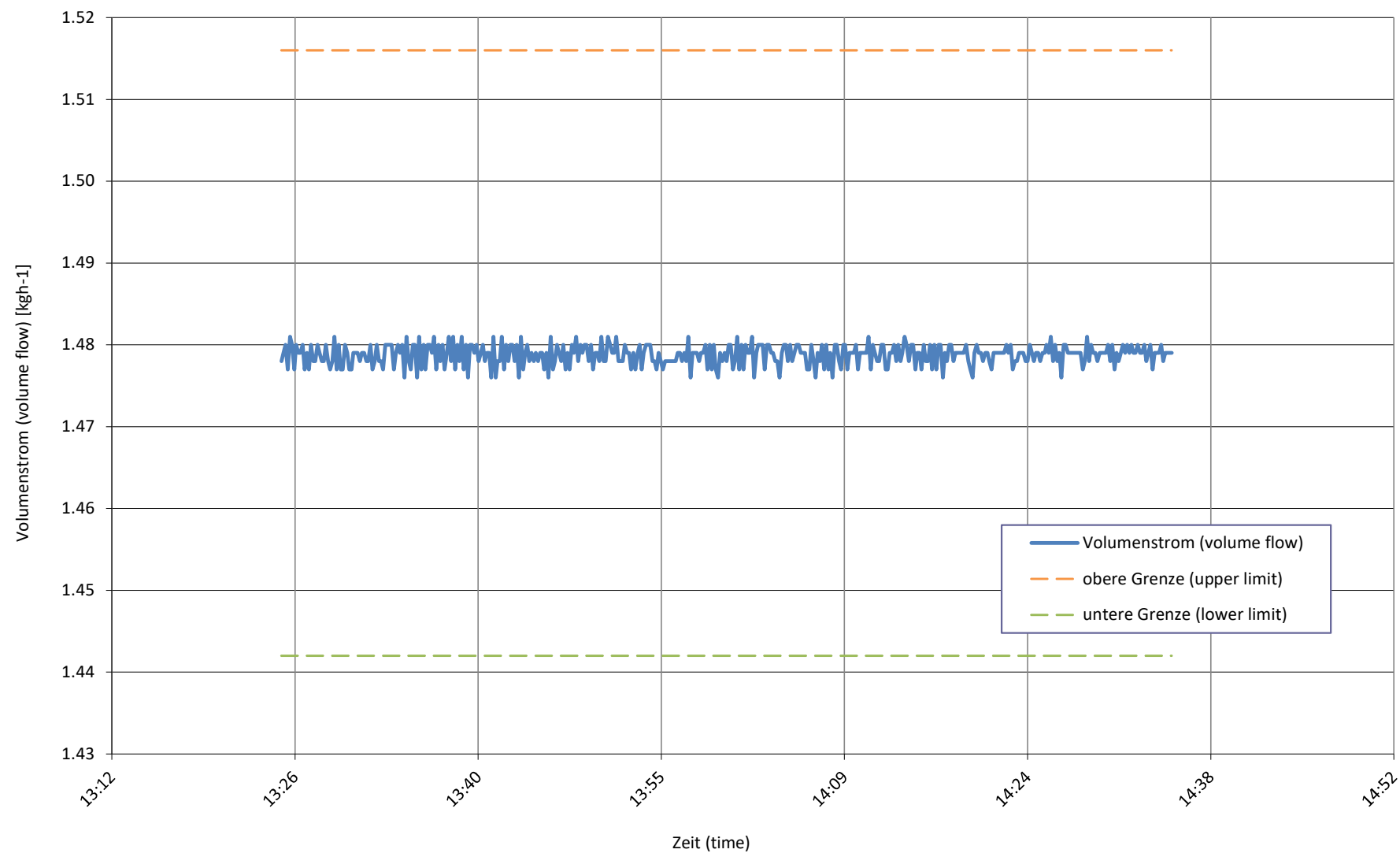


relative Luftfeuchtigkeit bei
relative humidity at **A12 / Wxx-30 D**



Senkenmassenstrom bei
sink mass flow at

A12 / Wxx-30 D



Prüfbedingung
Test condition

A-10 / Wxx-55 E

Prüfnummer
Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Heizleistung (heating capacity) inkl. Umwälzpumpe (included circulation pump) | W | 7925 | ± 219 | ± 2.74% |
| a Heizleistung (heating capacity) | W | 8001 | ± 188 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | -10.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | -9.47 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 67.5 | ± 2.7 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 50.34 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 55.00 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 1478.7 | ± 14.8 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -106.34 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggastemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgastemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 7189 | ± 85 | ± 1.19% |
| Wirkleistung (power input) | W | 7309 | ± 66 | |
| Spannung (voltage) | V | 233.9 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 10.73 | ± 0.06 | |
| Scheinleistung (apparent output) | VA | 7362 | ± 59 | |
| Leistungsfaktor cosp (power factor) | - | 0.993 | ± 0.001 | |
| 3 COP (COP) | - | 1.102 | ± 0.043 | ± 3.92% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 20.7 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 01:10:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 21:20:10 | 17.01.2025 | 2025-01-17 |
| Prüfende (end of test) | hh:mm:ss | 22:30:10 | 17.01.2025 | 2025-01-17 |

6 Bemerkung (remark)

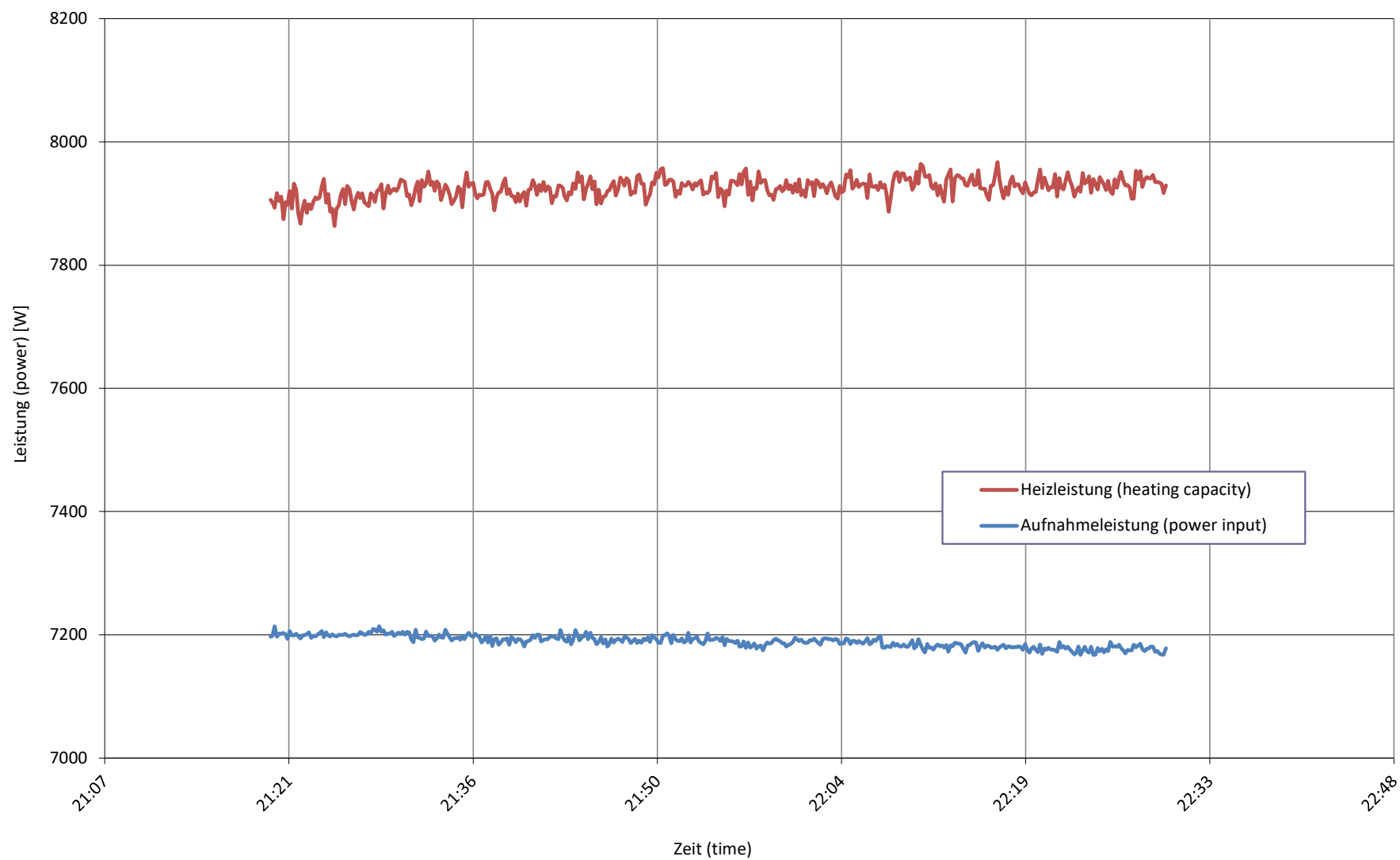
- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 95 rps
- Ventilatorumdrehzahl / fan speed = 780 rpm (Level 10)
- LEVa = 420 pls

7 Prüfer (supervisor) C. Schaible

Prüfnorm (test standard)

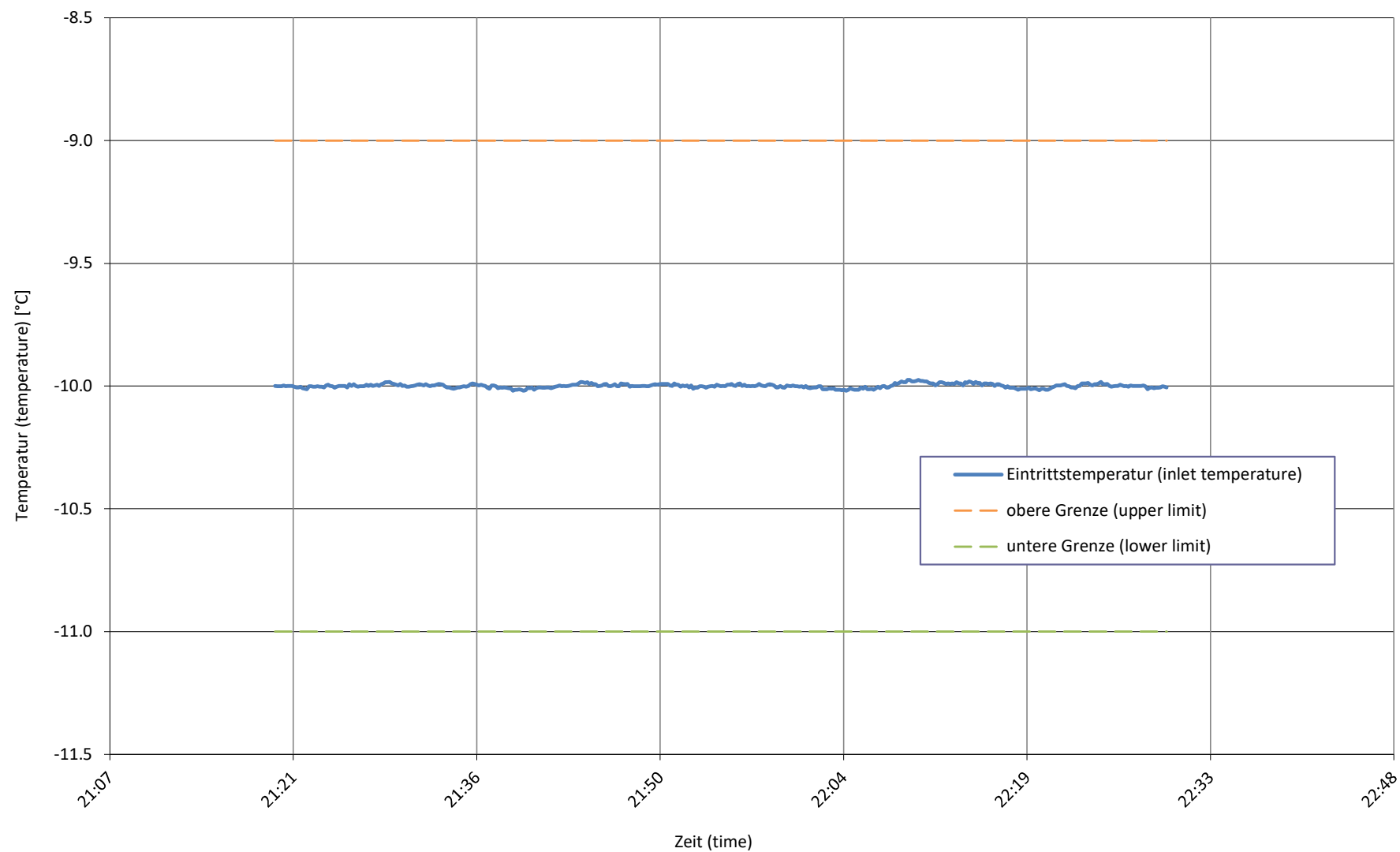
EN 14511-2:2022
EN 14511-3:2022
EN 14825:2022

passed
passed
passed

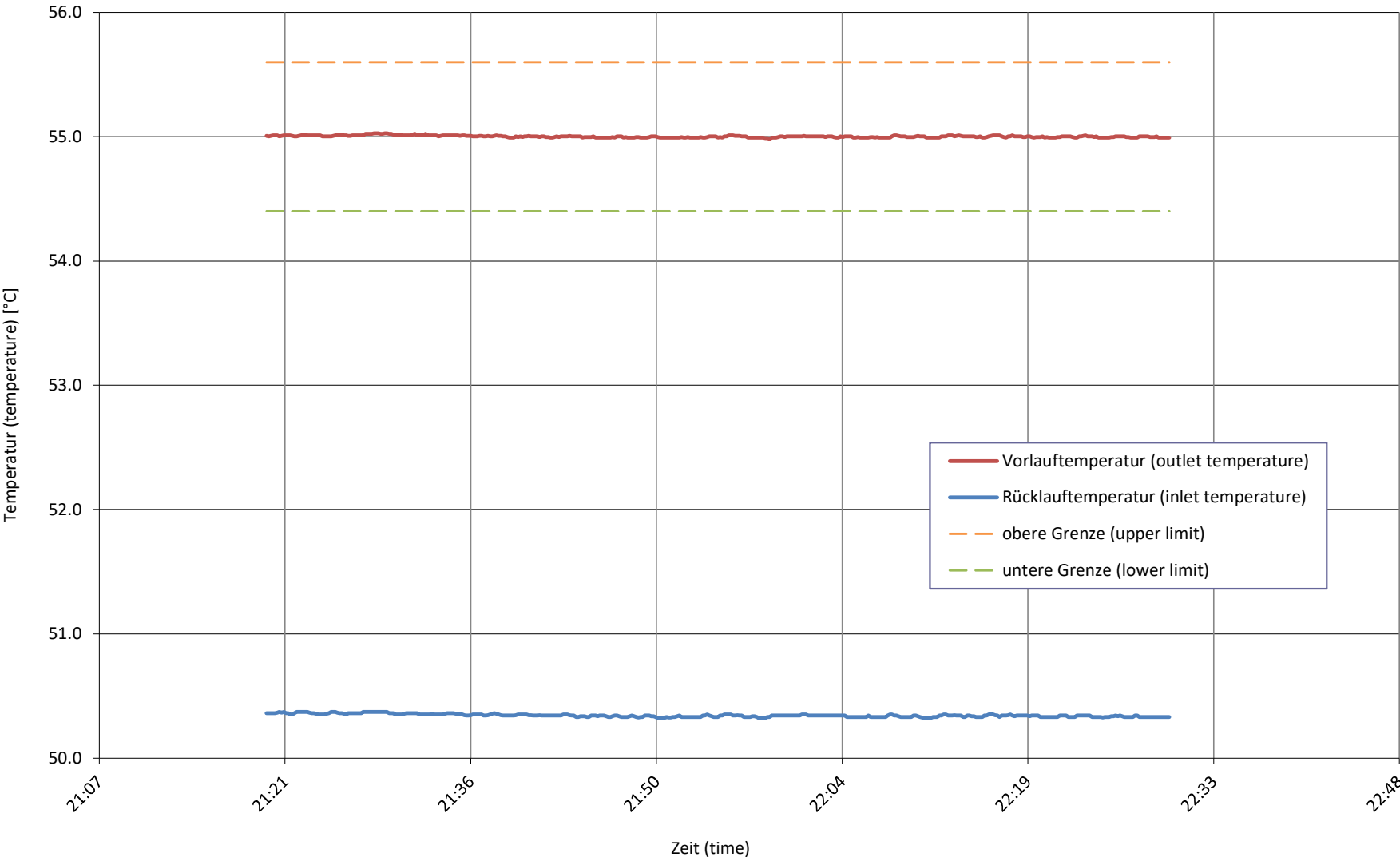
Wärme- und Aufnahmeleistung bei
heating capacity and input power at**A-10 / Wxx-55 E**

Quellentemperatur bei
source temperature at

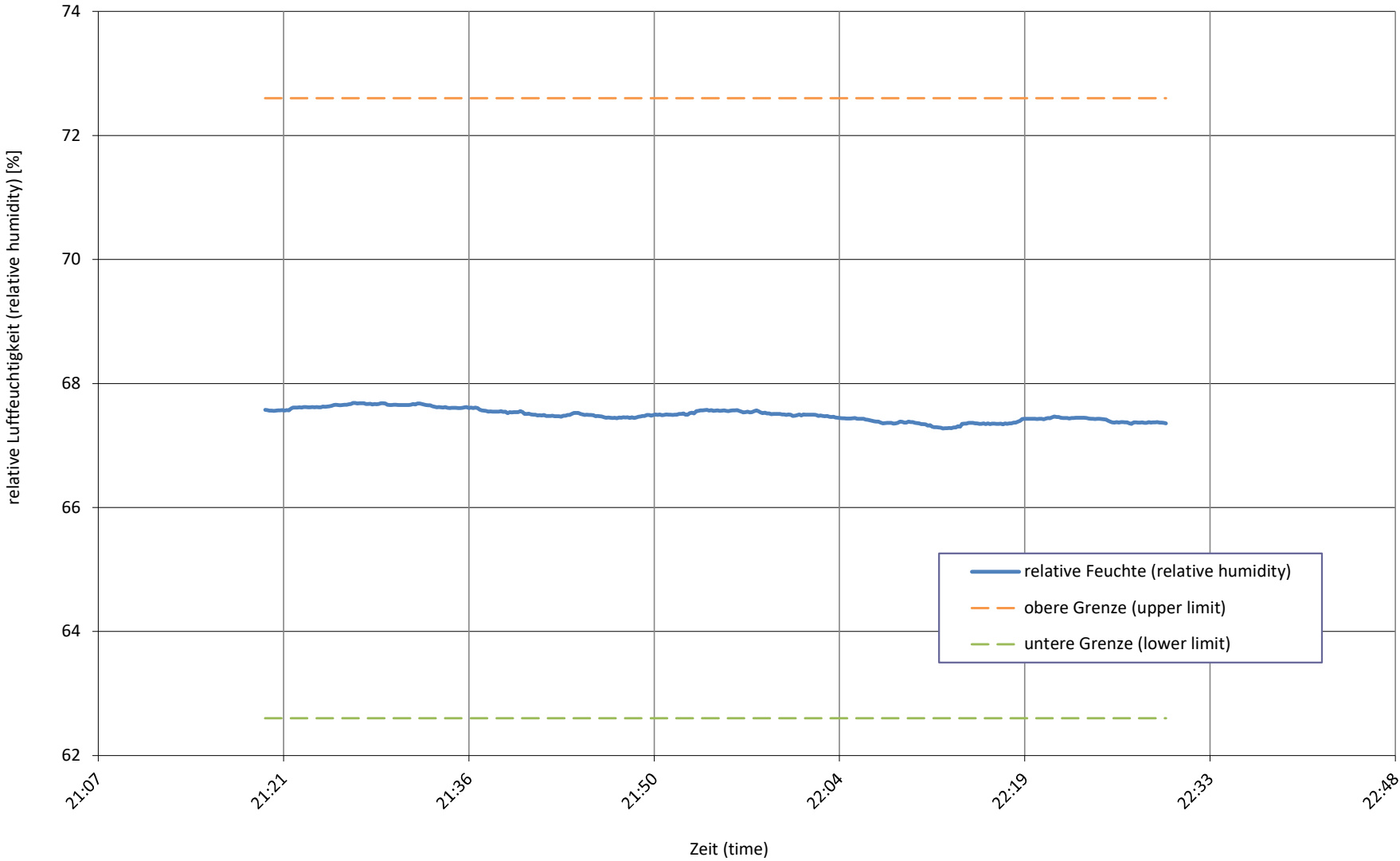
A-10 / Wxx-55 E



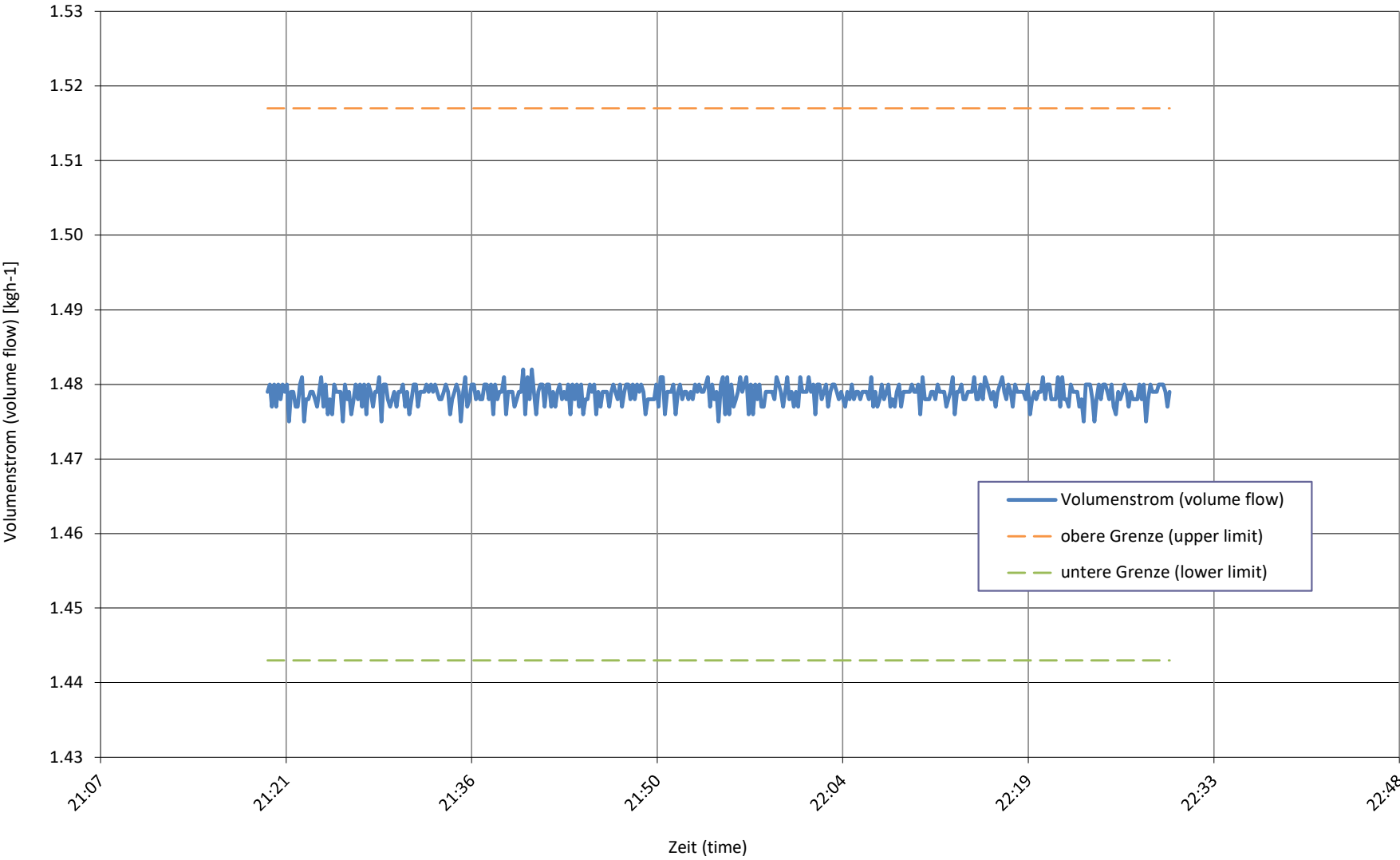
Senktemperatur bei
sink temperature at **A-10 / Wxx-55 E**



relative Luftfeuchtigkeit bei
relative humidity at **A-10 / Wxx-55 E**



Senkenmassenstrom bei
sink mass flow at **A-10 / Wxx-55 E**



Prüfbedingung
Test condition

A35 / W23-18

Prüfnummer
Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Kälteleistung (cooling capacity) inkl. Umwälzpumpe (included circulation pump) | W | 16178 | ± 394 | ± 2.45% |
| a Kälteleistung (cooling capacity) | W | 16094 | ± 359 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 35.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | 44.42 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 44.2 | ± 1.2 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 22.88 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 17.92 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 2790.9 | ± 27.9 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -65.12 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggastemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgastemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 3737 | ± 57 | ± 1.52% |
| Wirkleistung (power input) | W | 3871 | ± 35 | |
| Spannung (voltage) | V | 231.8 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 5.66 | ± 0.03 | |
| Scheinleistung (apparent output) | VA | 3885 | ± 31 | |
| Leistungsfaktor cosp (power factor) | - | 0.996 | ± 0.001 | |
| 3 EER (EER) | - | 4.329 | ± 0.172 | ± 3.97% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 20.7 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 00:35:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 18:50:00 | 24.01.2025 | 2025-01-24 |
| Prüfende (end of test) | hh:mm:ss | 19:25:00 | 24.01.2025 | 2025-01-24 |

6 Bemerkung (remark)

- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 56 rps
- Ventilatorumdrehzahl / fan speed = 700 rpm (Level 9)
- LEVa = 210 pls

7 Prüfer (supervisor) C. Schaible

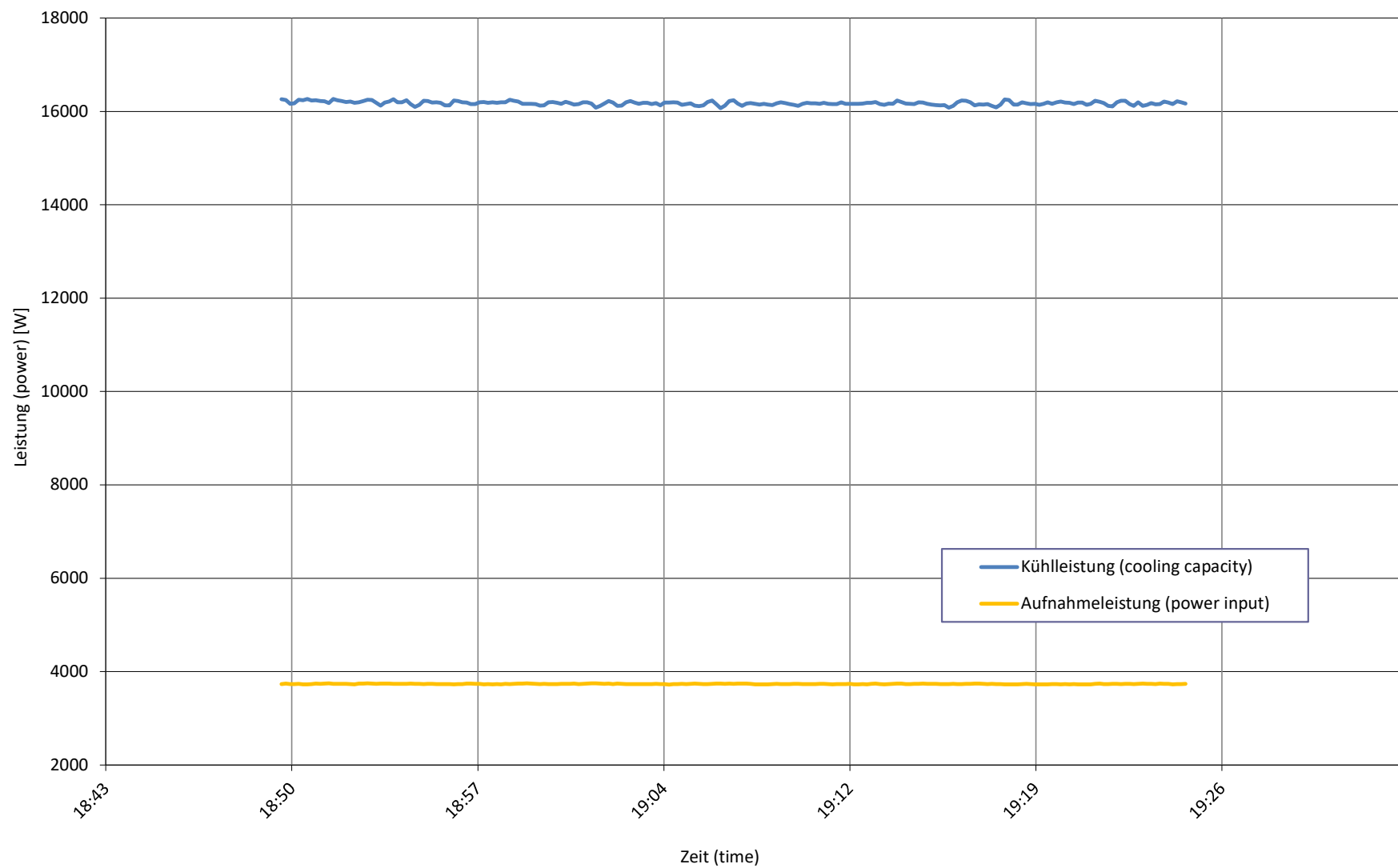
Prüfnorm (test standard)

EN 14511-2:2022
EN 14511-3:2022
EN 14825:2022

passed
passed
passed

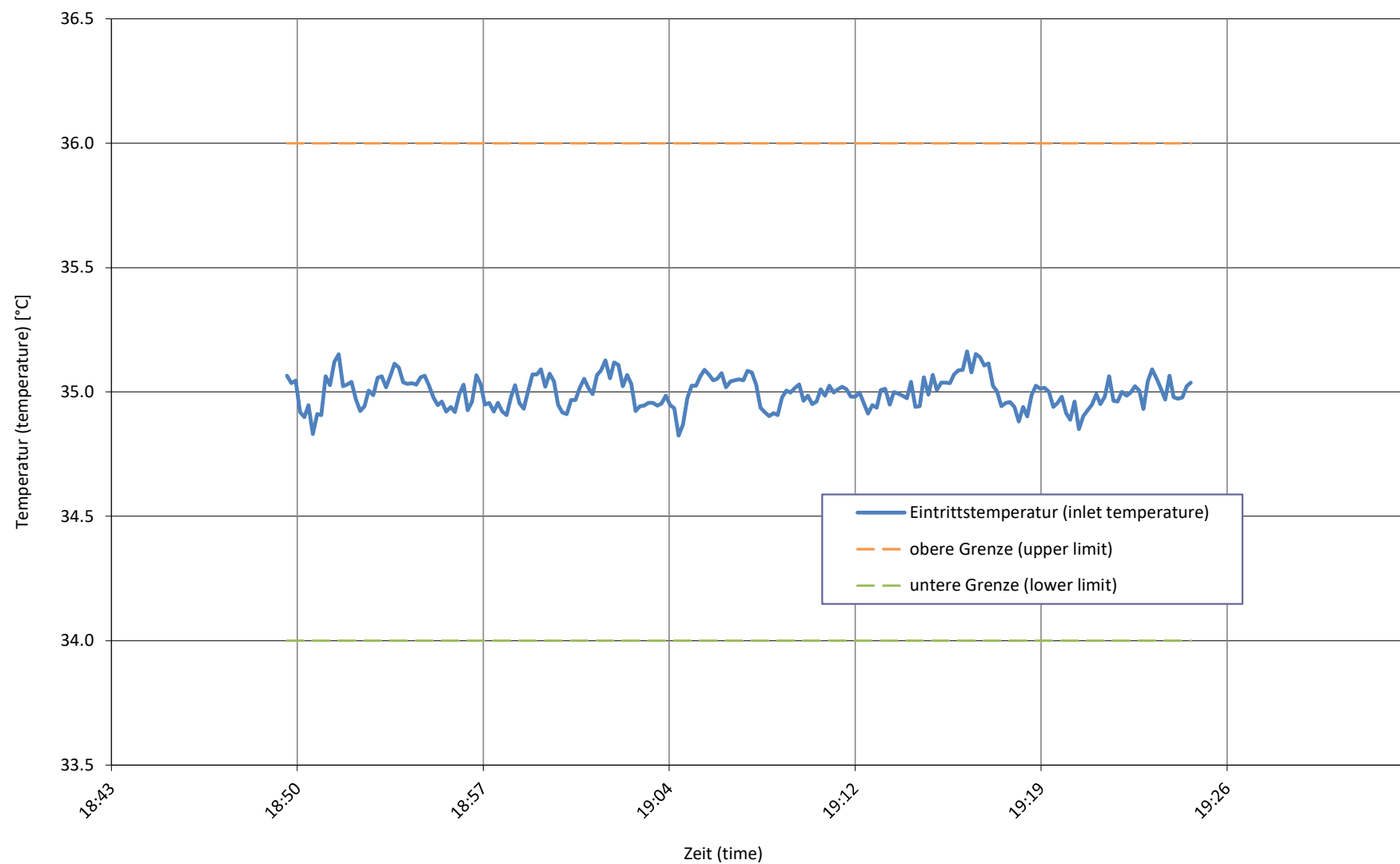
Kälte- und Aufnahmeleistung bei
cooling capacity and input power at

A35 / W23-18



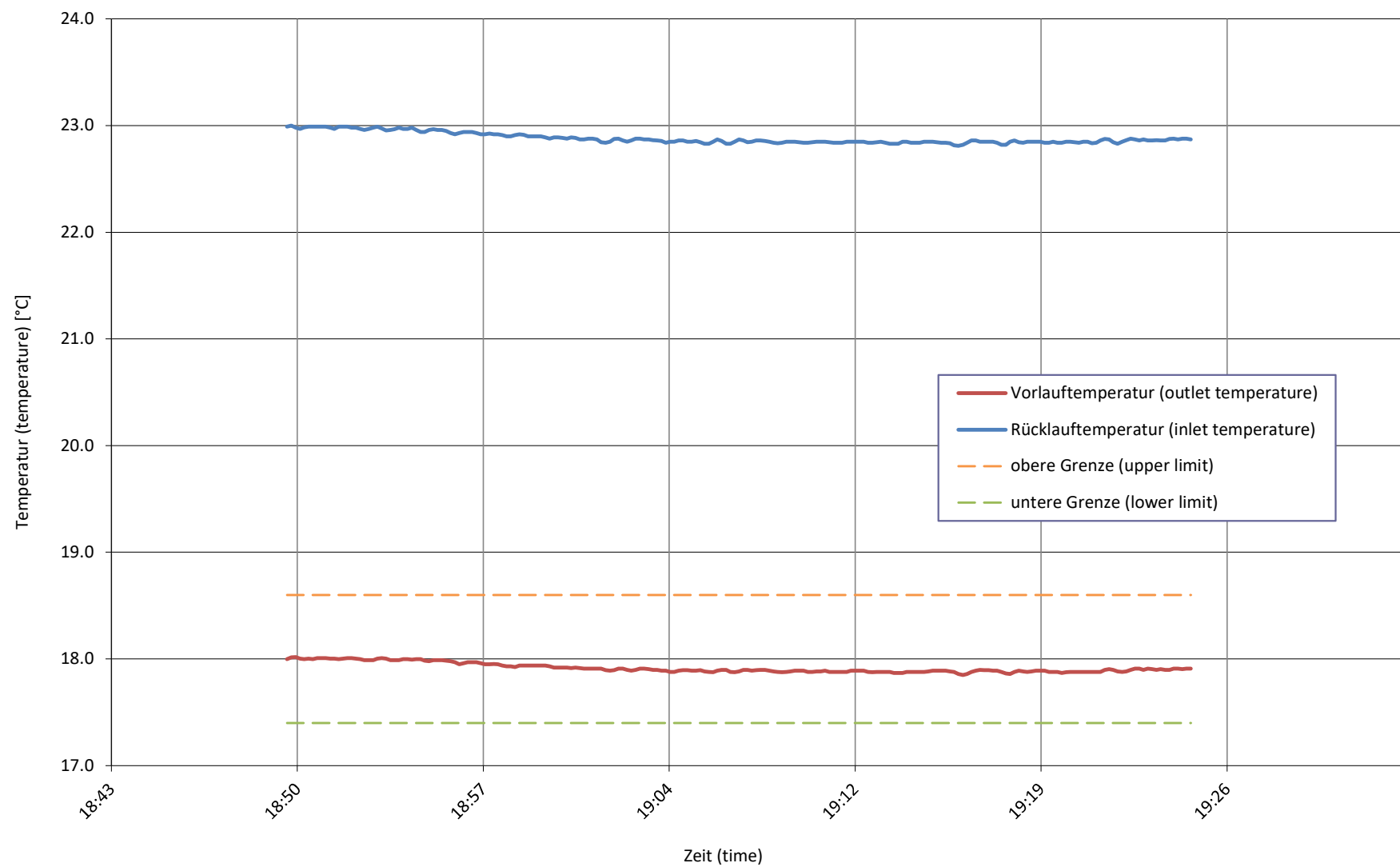
Quellentemperatur bei
source temperature at

A35 / W23-18

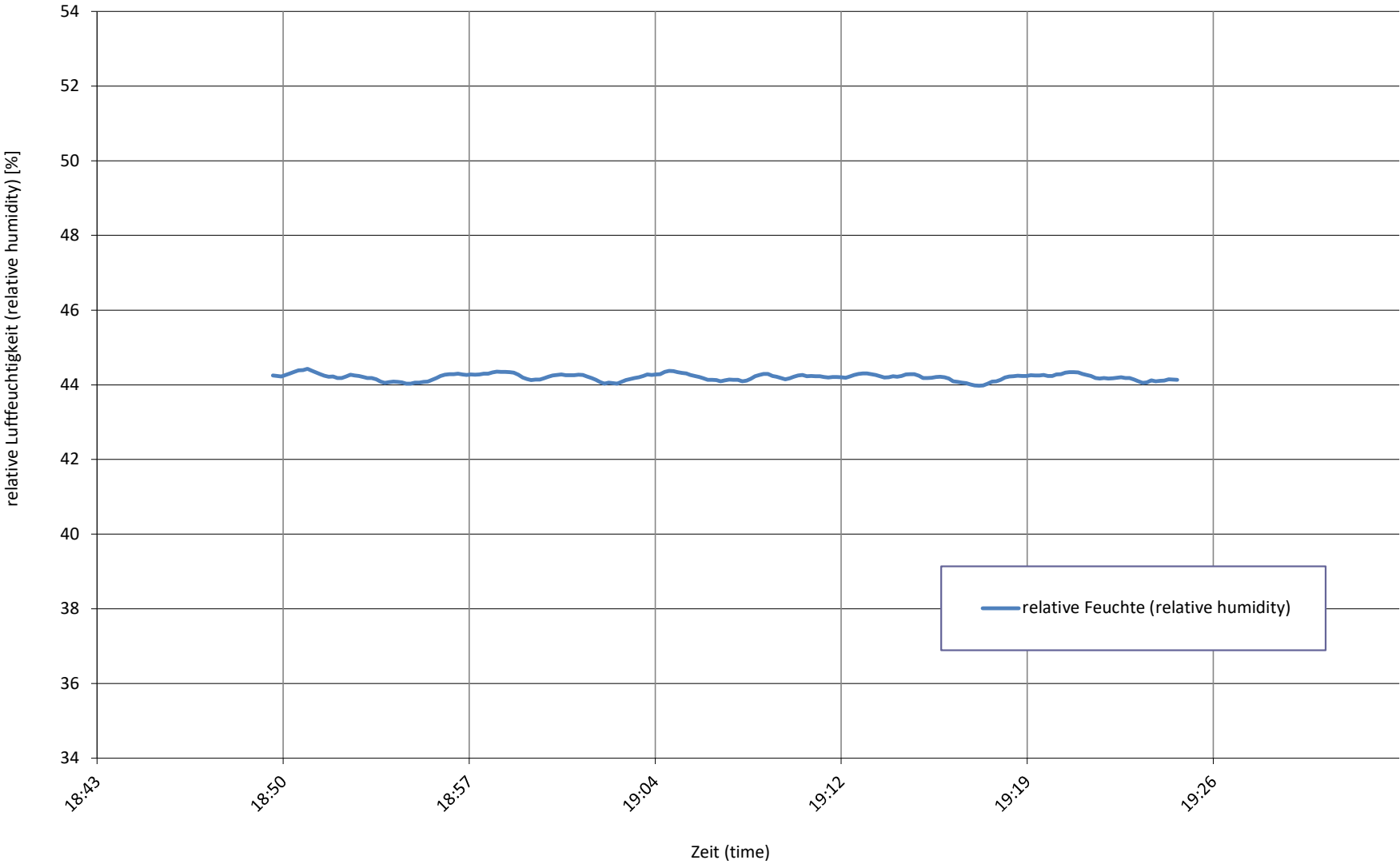


Senktemperatur bei
sink temperature at

A35 / W23-18

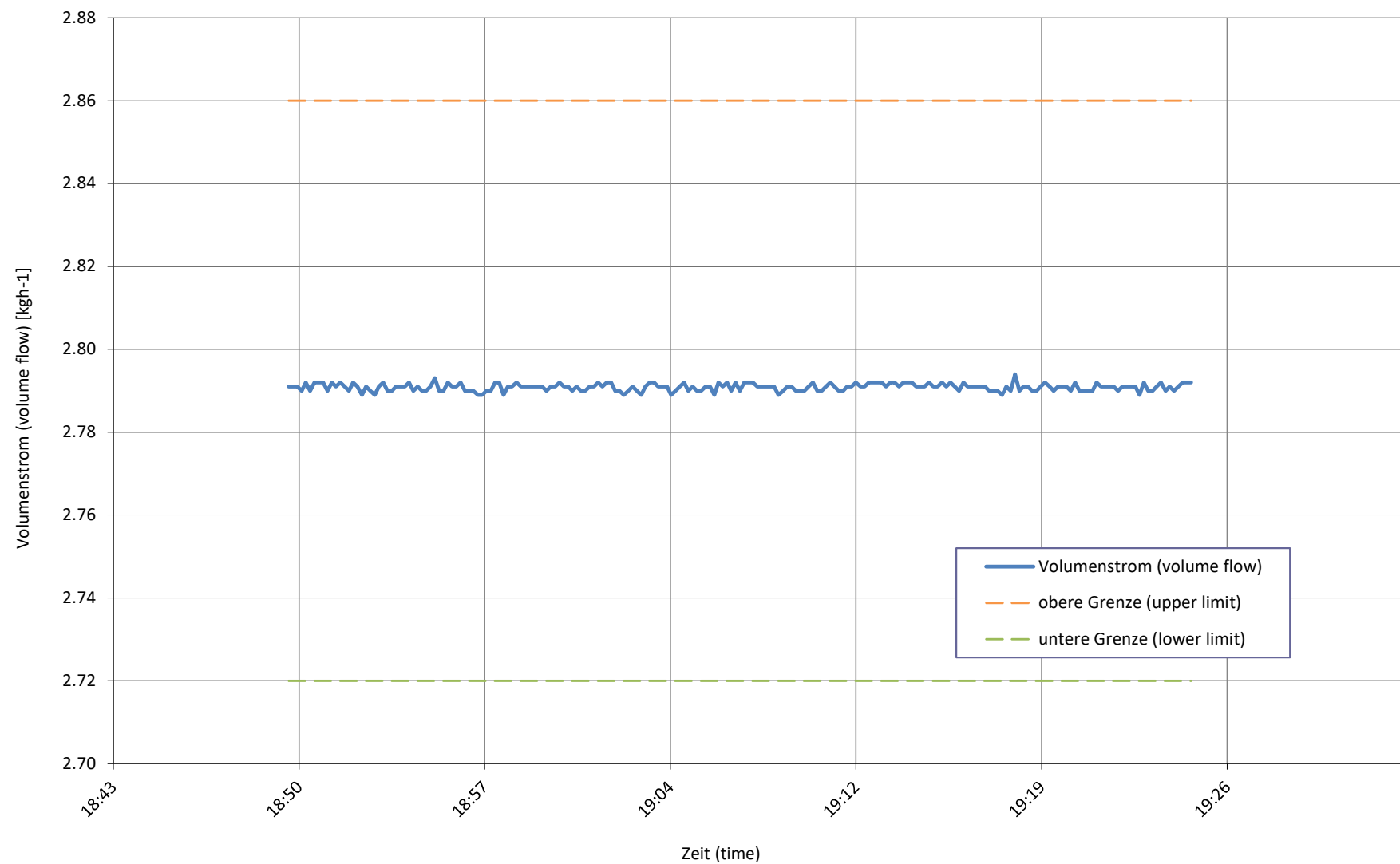


relative Luftfeuchtigkeit bei
relative humidity at **A35 / W23-18**



Senkenmassenstrom bei
sink mass flow at

A35 / W23-18



Prüfbedingung
Test condition

A35 / W12-7

Prüfnummer
Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|--|--------------------|--------------------------|-------------------------------|-------------------------------|
| 1 Kälteleistung (cooling capacity) inkl. Umwälzpumpe (included circulation pump) | W | 14566 | ± 354 | ± 2.45% |
| a Kälteleistung (cooling capacity) | W | 14479 | ± 318 | |
| b Lufteintrittstemperatur (air inlet temperature) | °C | 35.00 | ± 0.10 | |
| Luftaustrittstemperatur (air outlet temperature) | °C | 44.58 | ± 0.50 | |
| Luftdruck (air pressure) | hPa | 972 | ± 19 | |
| Relative Luftfeuchtigkeit (relative humidity) | % | 50.7 | ± 1.4 | |
| c Rücklauftemperatur (water inlet temperature) | °C | 12.04 | ± 0.07 | |
| Vorlauftemperatur (water outlet temperature) | °C | 6.97 | ± 0.07 | |
| Massenstrom (mass flow) | kg h ⁻¹ | 2461.3 | ± 24.6 | |
| Hydraulischer Druckabfall (hydraulic pressure drop) | kPa | -77.21 | ± 0.25 | |
| d Abtaudauer (period of defrosting) | min | - | | |
| Heizdauer (period of heating) | min | - | | |
| Relative Abtaudauer (relative duration of defrosting period) | % | - | | |
| Abtauleistung (defrosting output) | W | - | ± - | ± - |
| e Niederdruck (low pressure) | bara | - | ± - | |
| Sauggasttemperatur (suction gas temperature) | °C | - | ± - | |
| Hochdruck (high pressure) | bara | - | ± - | |
| Heissgasttemperatur (hot gas temperature) | °C | - | ± - | |
| Flüssigkeitstemperatur (condenser outlet temperature) | °C | - | ± - | |
| 2 Wirkleistung total (total power input) inkl. Umwälzpumpe (included circulation pump) | W | 5197 | ± 71 | ± 1.36% |
| Wirkleistung (power input) | W | 5337 | ± 48 | |
| Spannung (voltage) | V | 232.4 | ± 0.5 | |
| Stromaufnahme (current consumption) | A | 7.83 | ± 0.05 | |
| Scheinleistung (apparent output) | VA | 5360 | ± 43 | |
| Leistungsfaktor cosp (power factor) | - | 0.996 | ± 0.001 | |
| 3 EER (EER) | - | 2.803 | ± 0.107 | ± 3.81% |
| 4 Umgebungstemperatur (ambient temperature) | °C | 20.9 | ± 1.5 | |
| 5 Prüfdauer (test duration) | hh:mm:ss | 00:35:00 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 13:26:00 | 24.01.2025 | 2025-01-24 |
| Prüfende (end of test) | hh:mm:ss | 14:01:00 | 24.01.2025 | 2025-01-24 |

6 Bemerkung (remark)

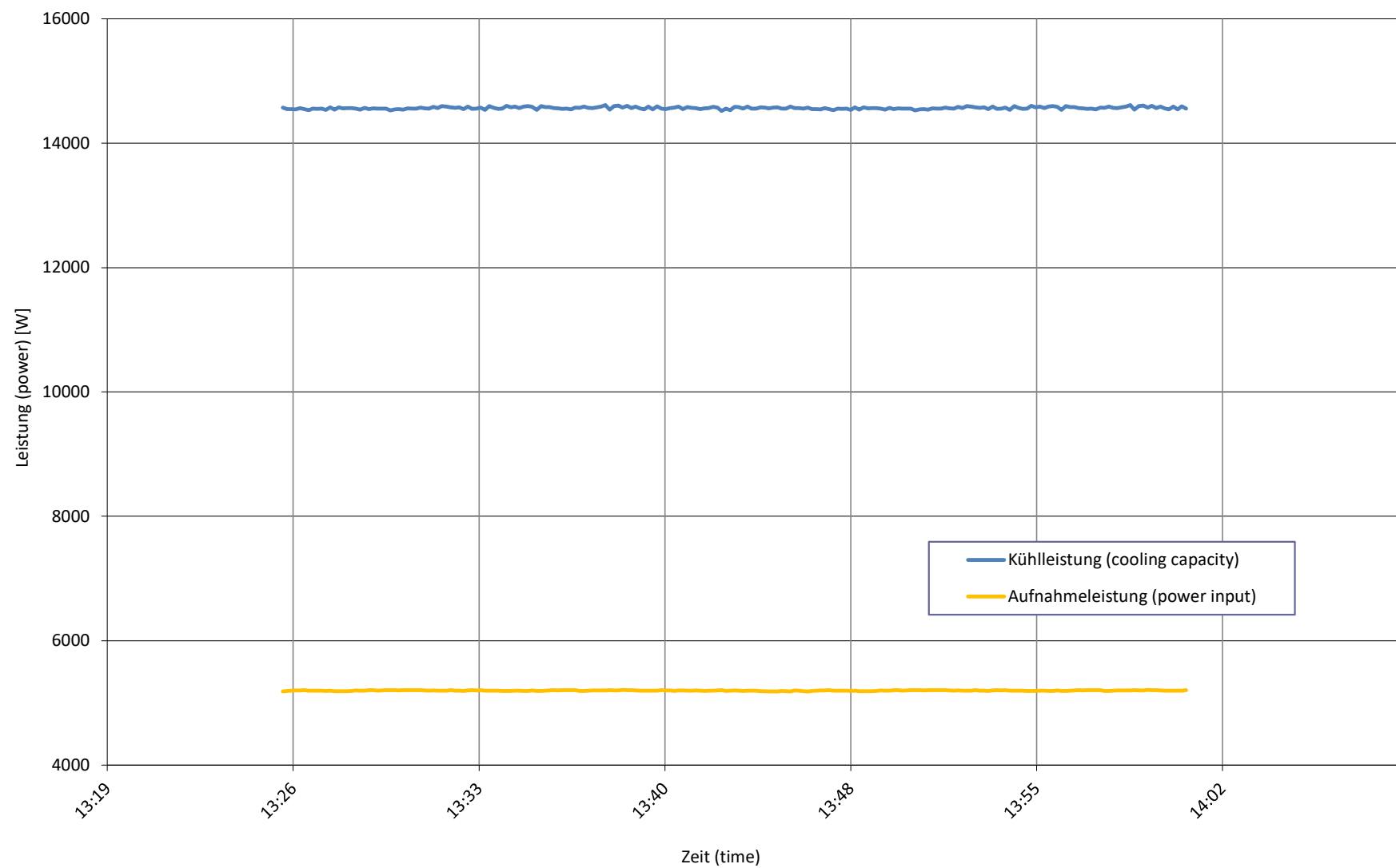
- Messung wurde mit integrierter UWP durchgeführt / Measurement is carry out with internal installation pump
- Kompressorfrequenz / compressor speed = 74 rps
- Ventilatorumdrehzahl / fan speed = 700 rpm (Level 9)
- LEVa = 170 pls

7 Prüfer (supervisor) C. Schaible

Prüfnorm (test standard)

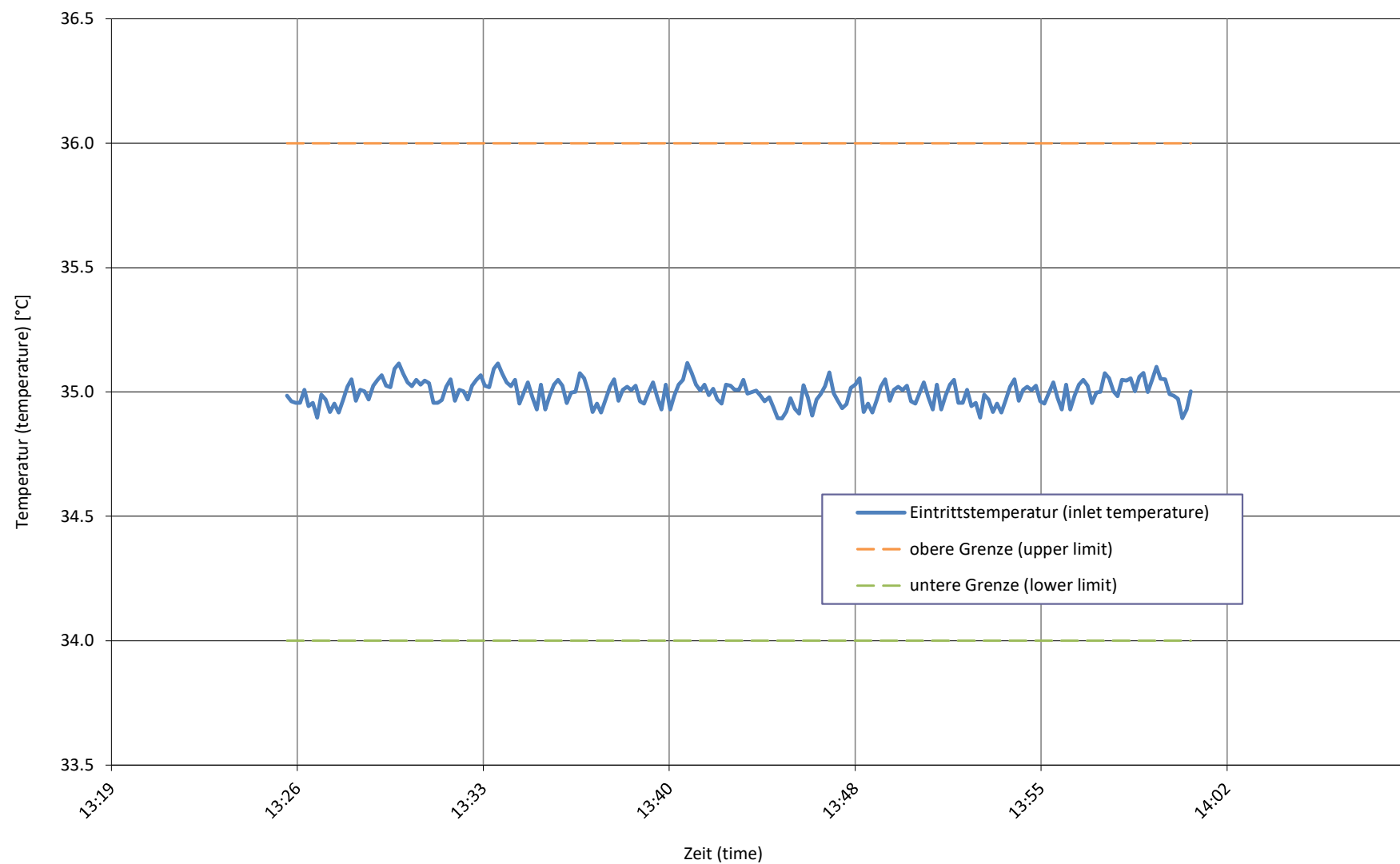
EN 14511-2:2022
EN 14511-3:2022
EN 14825:2022

passed
passed
passed

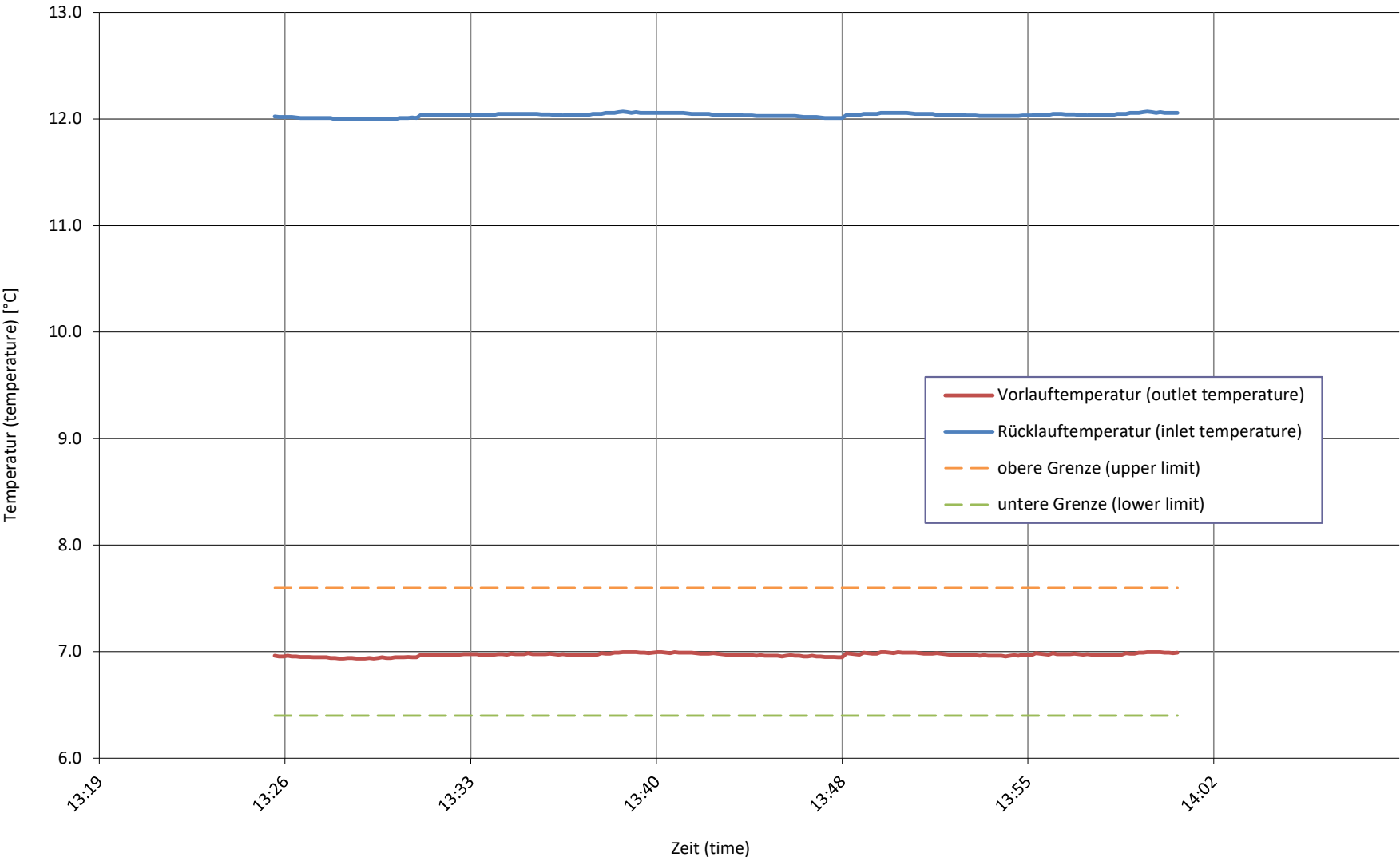
Kälte- und Aufnahmeleistung bei
cooling capacity and input power at**A35 / W12-7**

Quellentemperatur bei
source temperature at

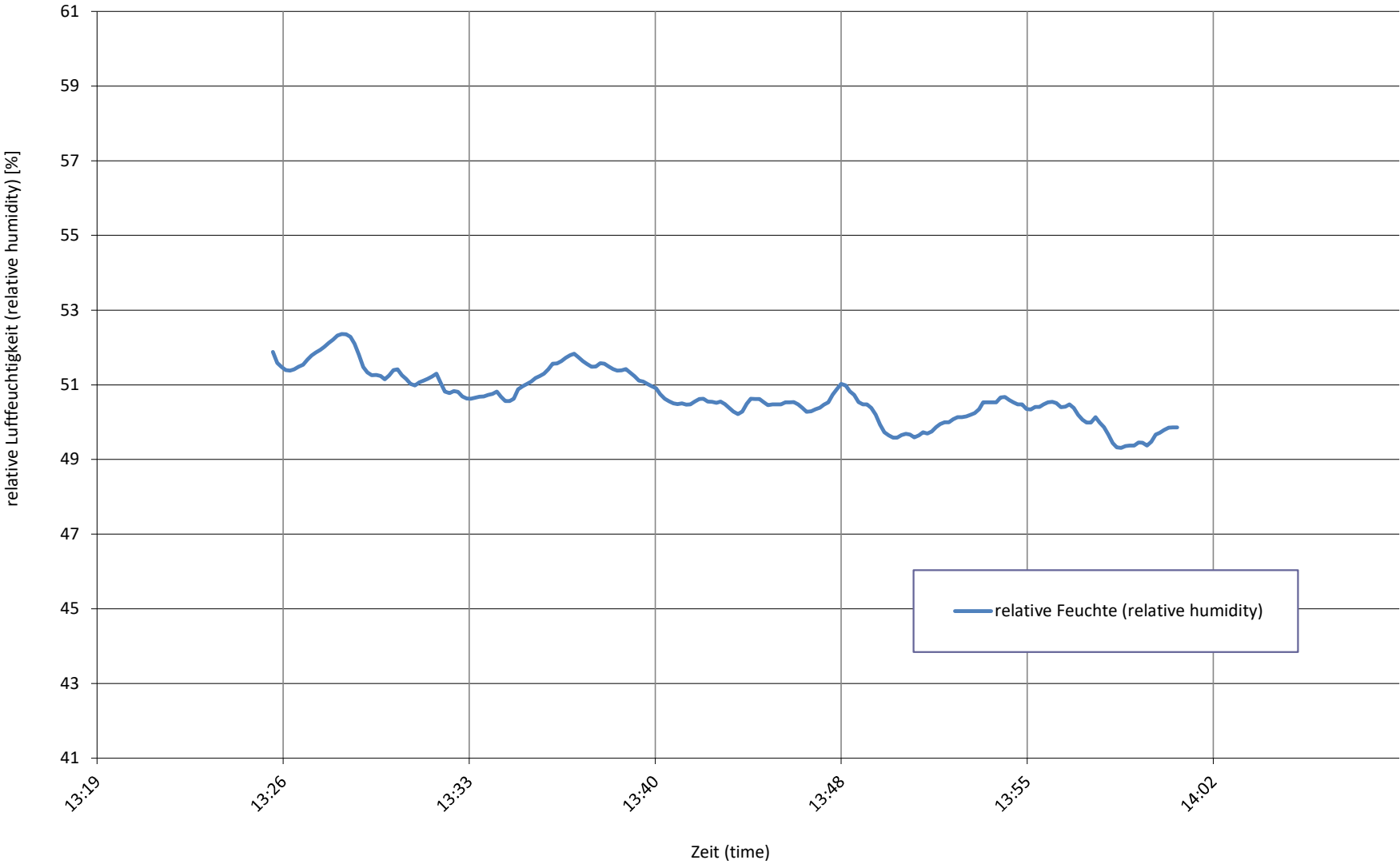
A35 / W12-7



Senktemperatur bei
sink temperature at **A35 / W12-7**

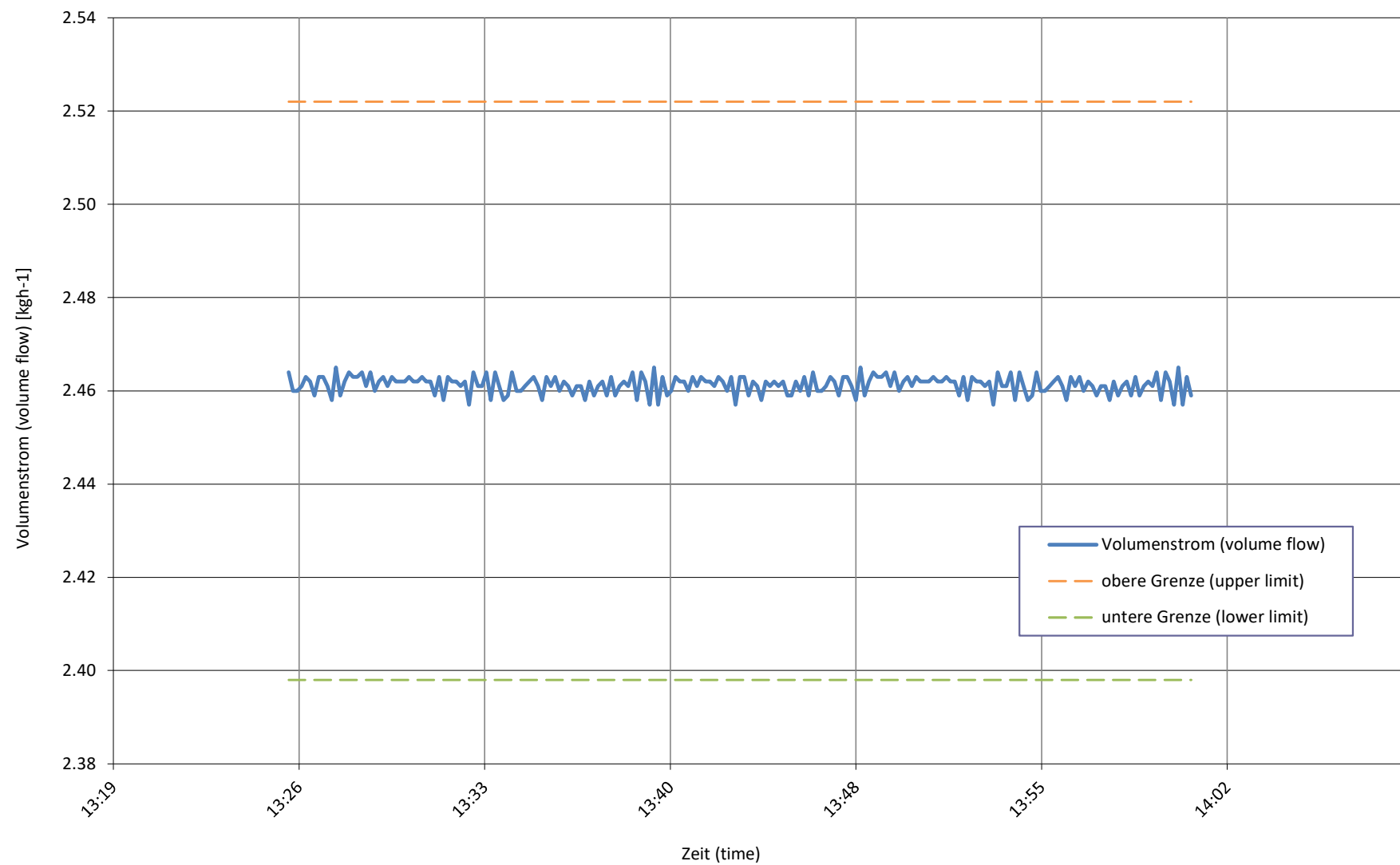


relative Luftfeuchtigkeit bei
relative humidity at **A35 / W12-7**



Senkenmassenstrom bei
sink mass flow at

A35 / W12-7





Von der Schweizerischen Akkreditierungsstelle akkreditierte Prüfstelle
Laboratoire d'essai accrédité par le Service d'Accréditation Suisse
Testing Laboratory accredited by the Swiss Accreditation Service

Akkreditierungs-Nr.
No. d'accréditation STS 0499
Accreditation No.

The Swiss Testing Service is one of the signatories to the EAL
Multilateral Agreement for the recognition of test certificates

Prüfnummer LW-696-25-02
No. d'essai -
Test No. Version 1

Prüfzertifikat - SchalleLeistungspegel
Certificat d'essai - Niveau de puissance acoustique
Test certificate - Sound power level

Auftraggeber Refsystem Sp. Zzo. o
Client ul. Metalowcow 5
Customer PL - 86-300 Grudziadz

Datum der Prüfung
Date du test 24.01.2024
Date of test

Gerät Haier
Type AU162FYCRA(HW)
Type SN: AA2JT 3E290 OAUNA H0130

Messobjekt Aussenmessung
Object de mesure Mesure extérieure
Measuring object Outdoor measurement

Prüfbedingung **A7 / W47-55**
Condition d'essai Compressor speed = 24 Hz
Test condition Fan speed = 320 rpm

Genauigkeitsklasse
Precision classe 2
Accuracy class

SchalleLeistungspegel
Niveau de puissance acoustique dB(A) 61.9
Sound power level

Messunsicherheit
Ecart type dB ± 1.5
Standard deviation

Messung wurde gemäss der folgenden Norm durchgeführt
Mesures exécutées conformément aux normes
Measurement regarding the following standard

EN ISO 9614-1 and EN 12102-1
NF 414 rev13 / RS 6C003-2018 LCP Rev1
EHPA test regulation V2.4

Dieses Prüfzertifikat darf ohne schriftliche Zustimmung der Prüfstelle nicht auszugsweise vervielfältigt werden.
Ce certificat d'essai ne doit pas être reproduit, sinon en entier, sans l'autorisation écrite du laboratoire d'essai.
This test certificate shall not be reproduced except in full, without written approval of the testing laboratory.

Stempel und Datum
Timbre et date
Stamp and date

27.01.2025

Prüfer
Contrôleur
Supervisor

M. Eschmann, Dipl. Ing. FH

Messort
Site de mesure
Measuring site

Wärmepumpen-Testzentrum WPZ
Werdenbergstrasse 4
CH-9471 Buchs (Switzerland)



Verwendete Messgeräte / Employer d'appareillage de mesure / Measuring instruments in use

| Bezeichnung / Description / Description | Gerät / Type / Type | Seriennr. / No. de Série / Serial no. |
|---|--|---------------------------------------|
| Real Time Analyzer | 01 dB-Metavib PCMCIA-Card | #1912 #0001912 |
| Auswertesoftware | dBFA | Version 4.7.01 |
| Utilisation de software | Excel-Sheet | Version 1.0/me |
| Analysis software | | |
| Intensitätssonde | G.R.A.S Typ 50AI-B | 38213 |
| Sonde de intensité | | |
| Intensity sonde | | |
| Mikrofonpaar | Typ 40 AK | 49855 |
| Couple de microphone | | 49876 |
| Couple of microphone | | |
| Vorverstärker | Typ 26AA | 48806 |
| Amplificateur d'entrée | | 48807 |
| Pre-amplifier | | |
| Zuordnung | Kanal A - Vorverstärker 48806 - Mikrofon 49855 Kanal B - Vorverstärker 48807 - Mikrofon 49876 | |
| Attribution | Canal A - Amplificateur d'entrée 48806 - Microphone 49855 Canal B - Amplificateur d'entrée 48807 - Microphone 49876 | |
| Attribution | Channel A - Pre-amplifier 48806 - Microphone 49855 Channel B - Pre-amplifier 48807 - Microphone 49876 | |
| Zubehör | Windschirm (Ellipsoid) | - |
| Accessoire | Abat-vent (ellipsoïde) | - |
| Accessory | Wind deflector (ellipsoid) | - |
| Kabel 5 m | AC0002 | - |
| Câble 5 m | | |
| Cable 5m | | |
| Schallintensitätskalibrator | G.R.A.S Typ 51AB | 49049 |
| Calibrateur d'intensité acoustique | | |
| Sound intensity calibrator | | |
| Akustischer Kalibrator Klasse 1 | Nor1251 | 29926 |
| Calibrateur acoustique classe 1 | | |
| Acoustic calibrator class 1 | | |



Messresultate mit Genauigkeitsklasse 1 / Résultat de mesure avec précision classe 1 / Measurement result with accuracy class 1

| Third band [dB] | L _w [dB] | Criteria 1 | | | Criteria 2 | | Criteria 3 | All criterias passed? | L _{W,A} [dB(A)] | |
|--------------------|------------------------|----------------|----------------|---------------------------------|----------------|-------------------------------------|--------------------------------------|--------------------------|-----------------------------|------------|
| | | F ₂ | L _d | L _d > F ₂ | F ₃ | F ₃ - F ₂ ≤ 3 | N - CF ₄ ² ≥ 0 | | | |
| 50 | 77.9 | 0.9 | 16.4 | OK | 9.7 | - | - | no | 47.7 | u |
| 63 | NEGATIV | 0.9 | 14.7 | OK | 9.7 | - | - | no | NEGATIV | s |
| 80 | 52.5 | 0.9 | 13.6 | OK | 9.7 | - | - | no | 30.0 | u |
| 100 | NEGATIV | 0.9 | 16.4 | OK | 9.7 | - | - | no | NEGATIV | s |
| 125 | 55.2 | 2.9 | 16.3 | OK | 4.6 | OK | - | no | 39.1 | u |
| 160 | 63.5 | 2.3 | 16.4 | OK | 3.2 | OK | - | no | 50.1 | u |
| 200 | 56.6 | 3.6 | 16.4 | OK | 4.5 | OK | - | no | 45.7 | u |
| 250 | 59.3 | 4.3 | 16.4 | OK | 4.3 | OK | OK | yes | 50.7 | u |
| 315 | 58.2 | 3.0 | 16.4 | OK | 3.0 | OK | - | no | 51.6 | u |
| 400 | 58.8 | 4.1 | 16.4 | OK | 4.1 | OK | OK | yes | 54.0 | <<< passed |
| 500 | 58.7 | 3.0 | 16.4 | OK | 3.0 | OK | OK | yes | 55.5 | <<< passed |
| 630 | 52.1 | 4.1 | 16.4 | OK | 4.1 | OK | OK | yes | 50.2 | u |
| 800 | 50.7 | 2.8 | 16.4 | OK | 2.8 | OK | OK | yes | 49.9 | u |
| 1k | 46.2 | 3.5 | 16.4 | OK | 3.5 | OK | - | no | 46.2 | u |
| 1.25k | 47.0 | 6.5 | 16.4 | OK | 9.7 | - | - | no | 47.6 | u |
| 1.6k | 43.4 | 3.2 | 16.4 | OK | 3.2 | OK | OK | yes | 44.4 | u |
| 2k | 42.6 | 3.3 | 16.4 | OK | 3.3 | OK | OK | yes | 43.8 | u |
| 2.5k | 41.3 | 2.9 | 16.4 | OK | 2.9 | OK | OK | yes | 42.6 | u |
| 3.15k | 42.5 | 4.4 | 16.4 | OK | 4.5 | OK | - | no | 43.7 | u |
| 4k | 44.1 | 3.4 | 16.4 | OK | 3.4 | OK | - | no | 45.1 | u |
| 5k | 44.8 | 10.3 | 16.4 | OK | 10.3 | OK | - | no | 45.3 | u |
| 6.3k | 36.6 | 3.3 | 15.0 | OK | 3.3 | OK | OK | yes | 36.5 | w |
| L _{W,A} | | | | | | | | | 61.9 | |

Legende / Legend

| | |
|---------------|--|
| <<< passed | <p>Terzbänder mit dieser Bezeichnung sind für die Genauigkeit des A-bewerteten Gesamtschallleistungspegel L_{W,A} massgebend.</p> <p>Mit "<<< passed" ist die geforderte Genauigkeitsklasse erfüllt.</p> <p>Third bands with this description are significant for accuracy of A-weighted total sound power level L_{W,A}.</p> <p>Required accuracy class is passed with "<<< passed".</p> |
| <<< no passed | <p>Terzbänder mit dieser Bezeichnung sind für die Genauigkeit des A-bewerteten Gesamtschallleistungspegel L_{W,A} massgebend.</p> <p>Mit "<<< no passed" ist die geforderte Genauigkeitsklasse nicht erfüllt.</p> <p>Third bands with this description are significant for accuracy of A-weighted total sound power level L_{W,A}.</p> <p>Required accuracy class isn't passed with "<<< no passed".</p> |
| u | <p>Terzbänder mit dieser Bezeichnung sind für die Genauigkeit des A-bewerteten Gesamtschallleistungspegel L_{W,A} unbedeutend, werden aber bei der Berechnung des L_{W,A} berücksichtigt.</p> <p>Third bands with this description aren't significant for accuracy of A-weighted total sound power level L_{W,A}, but shall be regarded on Calculation of L_{W,A}.</p> |
| s and w | <p>Terzbänder mit dieser Bezeichnung werden bei der Berechnung des L_{W,A} nicht berücksichtigt.</p> <p>Third bands with this description shall not be regarded on Calculation of L_{W,A}.</p> |



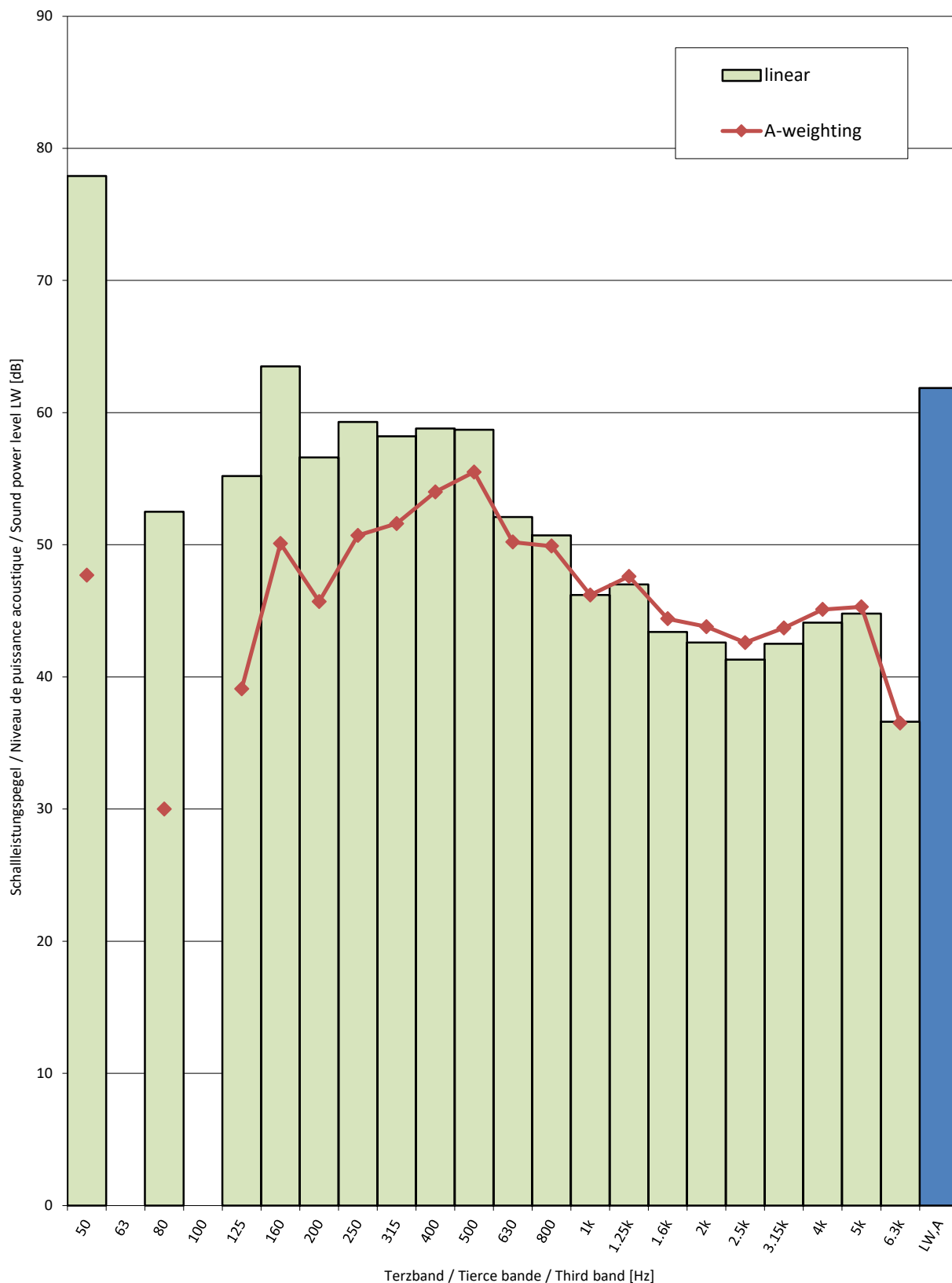
Messresultate mit Genauigkeitsklasse 2 / Résultat de mesure avec precision classe 2 / Measurement result with accuracy class 2

| Third band [dB] | L_w [dB] | Criteria 1 | | | Criteria 2 | | Criteria 3 | All criterias passed? | $L_{w,A}$ [dB(A)] | |
|--------------------|---------------|------------|-------|-------------|------------|--------------------|---------------------|--------------------------|----------------------|------------|
| | | F_2 | L_d | $L_d > F_2$ | F_3 | $F_3 - F_2 \leq 3$ | $N - CF_4^2 \geq 0$ | | | |
| 50 | 77.9 | 0.9 | 16.4 | OK | 9.7 | - | - | no | 47.7 | u |
| 63 | NEGATIV | 0.9 | 14.7 | OK | 9.7 | - | - | no | NEGATIV | s |
| 80 | 52.5 | 0.9 | 13.6 | OK | 9.7 | - | - | no | 30.0 | u |
| 100 | NEGATIV | 0.9 | 16.4 | OK | 9.7 | - | - | no | NEGATIV | s |
| 125 | 55.2 | 2.9 | 16.3 | OK | 4.6 | OK | - | no | 39.1 | u |
| 160 | 63.5 | 2.3 | 16.4 | OK | 3.2 | OK | OK | yes | 50.1 | u |
| 200 | 56.6 | 3.6 | 16.4 | OK | 4.5 | OK | OK | yes | 45.7 | u |
| 250 | 59.3 | 4.3 | 16.4 | OK | 4.3 | OK | OK | yes | 50.7 | u |
| 315 | 58.2 | 3.0 | 16.4 | OK | 3.0 | OK | OK | yes | 51.6 | u |
| 400 | 58.8 | 4.1 | 16.4 | OK | 4.1 | OK | OK | yes | 54.0 | <<< passed |
| 500 | 58.7 | 3.0 | 16.4 | OK | 3.0 | OK | OK | yes | 55.5 | <<< passed |
| 630 | 52.1 | 4.1 | 16.4 | OK | 4.1 | OK | OK | yes | 50.2 | u |
| 800 | 50.7 | 2.8 | 16.4 | OK | 2.8 | OK | OK | yes | 49.9 | u |
| 1k | 46.2 | 3.5 | 16.4 | OK | 3.5 | OK | OK | yes | 46.2 | u |
| 1.25k | 47.0 | 6.5 | 16.4 | OK | 9.7 | - | - | no | 47.6 | u |
| 1.6k | 43.4 | 3.2 | 16.4 | OK | 3.2 | OK | OK | yes | 44.4 | u |
| 2k | 42.6 | 3.3 | 16.4 | OK | 3.3 | OK | OK | yes | 43.8 | u |
| 2.5k | 41.3 | 2.9 | 16.4 | OK | 2.9 | OK | OK | yes | 42.6 | u |
| 3.15k | 42.5 | 4.4 | 16.4 | OK | 4.5 | OK | OK | yes | 43.7 | u |
| 4k | 44.1 | 3.4 | 16.4 | OK | 3.4 | OK | OK | yes | 45.1 | u |
| 5k | 44.8 | 10.3 | 16.4 | OK | 10.3 | OK | - | no | 45.3 | u |
| 6.3k | 36.6 | 3.3 | 15.0 | OK | 3.3 | OK | OK | yes | 36.5 | w |
| $L_{w,A}$ | | | | | | | | | 61.9 | |

Legende / Legend

| | |
|---------------|--|
| <<< passed | <p>Terzbänder mit dieser Bezeichnung sind für die Genauigkeit des A-bewerteten Gesamtschallleistungspegel $L_{w,A}$ massgebend.</p> <p>Mit "<<< passed" ist die geforderte Genauigkeitsklasse erfüllt.</p> <p>Third bands with this description are significant for accuracy of A-weighted total sound power level $L_{w,A}$.</p> <p>Required accuracy class is passed with "<<< passed".</p> |
| <<< no passed | <p>Terzbänder mit dieser Bezeichnung sind für die Genauigkeit des A-bewerteten Gesamtschallleistungspegel $L_{w,A}$ massgebend.</p> <p>Mit "<<< no passed" ist die geforderte Genauigkeitsklasse nicht erfüllt.</p> <p>Third bands with this description are significant for accuracy of A-weighted total sound power level $L_{w,A}$.</p> <p>Required accuracy class isn't passed with "<<< no passed".</p> |
| u | <p>Terzbänder mit dieser Bezeichnung sind für die Genauigkeit des A-bewerteten Gesamtschallleistungspegel $L_{w,A}$ unbedeutend, werden aber bei der Berechnung des $L_{w,A}$ berücksichtigt.</p> <p>Third bands with this description aren't significant for accuracy of A-weighted total sound power level $L_{w,A}$, but shall be regarded on Calculation of $L_{w,A}$.</p> |
| s and w | <p>Terzbänder mit dieser Bezeichnung werden bei der Berechnung des $L_{w,A}$ nicht berücksichtigt.</p> <p>Third bands with this description shall not be regarded on Calculation of $L_{w,A}$.</p> |

Spektrum Schallleistungspegel / Niveau de puissance acoustique du spectre /
Spectrum Sound power level LW





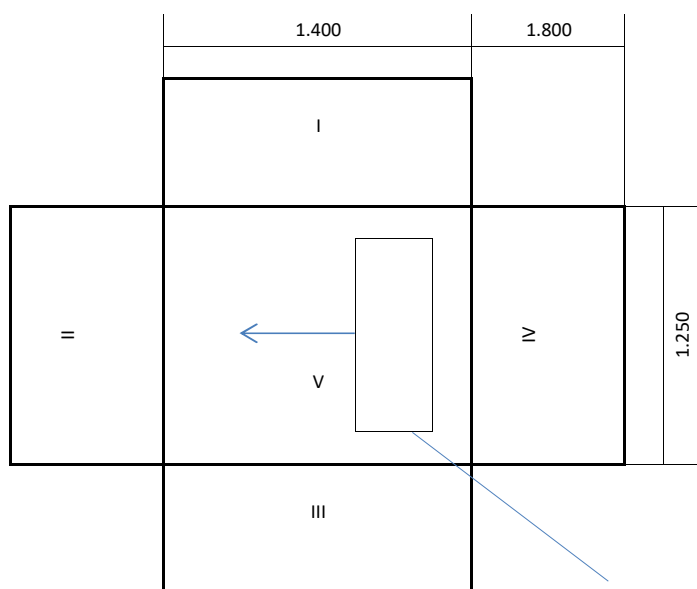
Hüllfläche / Face de mesure / Measurement surface

Abstand zur Hüllfläche

Distance à la face de mesure

min 0.1

Distance to measurement surface



Prüfling / Échantillon / Device

B x H x T

I x H x L

W x H x D

0.96 x 1.60 x 0.41

Segmente / Segments / Segments

I, III S= 2.520 m²

II, IV S= 2.250 m²

V S= 1.750 m²

Gesamte Hüllfläche

Surface de mesure totale

Total measurement surface

11.290 m²

Alle Angaben in Meter

Toutes les indications en mètres

All dimensions are given in meters

Bemerkung

Prüfbedingung
Test condition

Verbrauch (Consumption)
A12 / Wxx-24 D

Prüfnummer
Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|----------------------------------|-----------------|--------------------------|-------------------------------|-------------------------------|
| 1 Pto | W | 12.5 | ± 0.2 | ± 2.00% |
| 2 Psb | W | 17.2 | ± 0.3 | ± 2.00% |
| 3 Poff | W | 17.2 | ± 0.3 | ± 2.00% |
| 4 Pck | W | - | ± - | ± - |
| 5 Prüfdauer (test duration) | hh:mm:ss | 2:35:10 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 14:44:40 | 23.01.2025 | 2025-01-23 |
| Prüfende (end of test) | hh:mm:ss | 17:19:50 | 23.01.2025 | 2025-01-23 |

6 Bemerkung (remark)

7 Prüfer (supervisor) C. Schaible

Prüfnorm (test standard)

EN 14825

passed

Prüfbedingung
Test condition

Verbrauch (Consumption)
A12 / Wxx-30 D

Prüfnummer
Test number

LW-696-25-02

| Messgrößen Measured variables | Einheit Unit | Mittelwert Mean value | abs. Fehler absolute error | rel. Fehler relative error |
|----------------------------------|-----------------|--------------------------|-------------------------------|-------------------------------|
| 1 Pto | W | 11.3 | ± 0.2 | ± 2.00% |
| 2 Psb | W | 17.3 | ± 0.3 | ± 2.00% |
| 3 Poff | W | 17.3 | ± 0.3 | ± 2.00% |
| 4 Pck | W | - | ± - | ± - |
| 5 Prüfdauer (test duration) | hh:mm:ss | 17:46:50 | | |
| Prüfbeginn (beginning of test) | hh:mm:ss | 17:41:30 | 22.01.2025 | 2025-01-22 |
| Prüfende (end of test) | hh:mm:ss | 11:28:20 | 23.01.2025 | 2025-01-23 |

6 Bemerkung (remark)

7 Prüfer (supervisor) C. Schaible

Prüfnorm (test standard)

EN 14825

passed

Bilddokumentation / Pictorial documentation

Prüfnummer (Test number) LW-696-25-02

Prüfobjekt (Test type) Haier AU162FYCRA(HW)

Auftraggeber (Costumer) Refsystem Sp. z o.o.
ul. Metalowców 5
PL - 86-300 Grudziądz

Seriennummer (Serial number) AA2JT 3E290 0AUNA H0130

Identifikation / Identification

Typenschild (Identification plate)



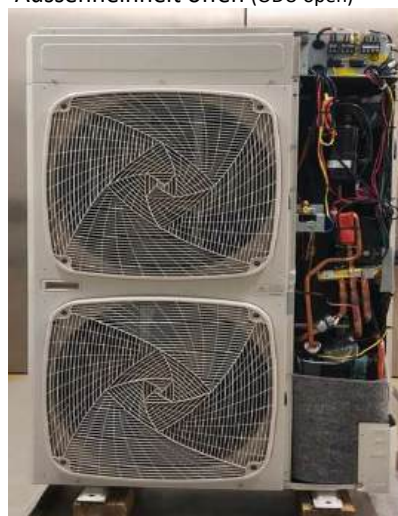
Bedienelement (control element)



Gesamtansicht Ausseneinheit (General view ODU)



Ausseneinheit offen (ODU open)



Hauptkomponenten / Main components

Verdampfer (Evaporator)



Kondensator (Condenser)



Kompressor (Compressor)



Kältekreis (refrigerant circuit)




Elektrische Einheit ODU (Electrical unit ODU)




Maschinenspezifische Angaben / Machine specific details

| | | | |
|---|--------------------------|--|---|
| Bauart Verdampfer (Construction of evaporator) | Lamellenwärmetauscher | | |
| Bauart Kondensator (Construction of condenser) | Plattenwärmetauscher | | |
| Kompressortyp (Compressor type) | Rollkolben | Anzahl Kompressor (Number of compressor) | 1 |
| Gebläseart (Construction of fan) | Axial | Anzahl Gebläse (Number of fan) | 2 |
| Bauart Expansionsventil (EXV type) | Elektronisch | | |
| Abmessungen (B x H x T) in mm Dimensions (w x h x d) | ODU 1200 x 1785 x 800 | | |
| Transportgewicht in kg Transportweight | 157 | | |


| | | |
|--|--------------------------|--|
|  | Heat Pump KEYMARK | |
| Annex A HP-KEYMARK testing conditions and rating rules | | Rev.-No.: 9 Date: 10/06/22 Page: 1 of 29 |

CONTENTS


| Date | Description of modification | Revision number |
|------------|---|-----------------|
| 14/12/2015 | Initial version | 1 |
| 10/03/2017 | Addition of air/air Editorial changes Annex E included in Annex A – reference to prEN12102-2 suppressed – Reference to EN 15979-1 is added – rating process chart was added – one testing point is added for periodic control test – periodic control test selection has been modified | 2 |
| 12/09/2017 | SCOP tool usage details Editorial changes Safety test for domestic hot water heat pumps Periodic surveillance process and rating rules have been modified | 3 |
| 07/03/2018 | Addition of “one off admission testing approach” Precisions on 4 way valves in type definition Addition of nominal point for air/air heat pumps Safety tests have been renamed “operating test” Addition of operating test in the surveillance process Operating tests EN14511-4 have been updated according EN14511-4 revision Clarification of admission sample process Correction of Pes tolerance Clarification of surveillance test matrix table 4 Chart 1 is deleted | 4 |
| 13/09/2018 | Addition of space cooling testing requirements for water-based heat pumps Addition of non-heated space air heat source for domestic hot water heat pumps Update of EN12102-1 standard | 5 |
| 19/03/2019 | Re-organisation: other sections than test description and rating rules are moved to scheme rules Hours to be considered for SEER calculation for water based heat pumps Operating test for DHW heat pump for surveillance test is corrected Introduction of testing conditions for gas heat pumps and hybrid heat pumps | 6 |
| 24/09/2019 | Addition of part D: CO ₂ heat pumps Addition of bin hours for the cooling mode | 7 |
| 17/03/2021 | Addition of part E with specific requirements for models within the same subtype not showing the same performance Clarification of acoustic test Errors in the rating rules are corrected + | 8 |

| | | |
|--|--------------------------|--|
|  | Heat Pump KEYMARK | |
| Annex A HP-KEYMARK testing conditions and rating rules | | Rev.-No.: 9 Date: 10/06/22 Page: 2 of 29 |


| | | |
|----------|---|---|
| | Clarification of DHW testing standards for hybrid heat pumps | |
| | Addition of tolerance on $P_{dh}(T_j)$ | |
| 10/06/22 | A.3.3: tolerance on heating up period is revised for heat pump water heaters Air/air heat pumps also providing domestic hot water are added. Clause A.1.4.1, is revised; clauses A.2.2.4, A.3.2.4 are added | 9 |

| | | |
|---|--------------------------|--|
|  | Heat Pump KEYMARK | |
| Annex A HP-KEYMARK testing conditions and rerating rules | | Rev.-No.: 9 Date: 10/06/22 Page: 3 of 29 |

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| | | |
|--|--------------------------|--|
|  | Heat Pump KEYMARK | |
| Annex A HP-KEYMARK testing conditions and rerating rules | | Rev.-No.: 9 Date: 10/06/22 Page: 4 of 29 |

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|-----------|--|-----------|
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A. Electrically driven heat pumps

Electrically driven heat pump application shall be conducted using the periodic testing approach or one off admission testing approach.

A.1. Tests description

A.1.1. Space heating tests

A.1.1.1. All types except air/air type

A.1.1.1.1. Space heating low temperature application

The testing points to be performed are the following:

- a) A7/W35; A20/W35; B0/W35; W10/W35 according to EN 14511-2 and E4/W35 according to EN 15879-1.
- b) Bivalent temperature condition according to EN 14825 for average climate
- c) One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- d) For any other climate, bivalent temperature condition shall be tested according to EN 14825

For water (brine)/water type, in case brine and water as heat source are declared, only one heat source shall be tested. The heat source to be tested is chosen by the certification body.

For exhaust air heat pump, the applicant shall declare the exhaust air volume flow that shall be used for space heating test.

A.1.1.1.2. Space heating medium temperature application

The testing points to be performed are the following:

- a) A7/W55; A20/W55; B0/W55; W10/W55 according to EN 14511-2 and E4/W55 according to EN 15879-1.
- b) Bivalent temperature condition according to EN 14825 for average climate
- c) One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- d) For any other climate, bivalent temperature condition shall be tested according to EN 14825


For water (brine)/water type, in case brine and water as heat source are declared, only one heat source shall be tested. The heat source to be tested is chosen by the certification body.

For exhaust air heat pump, the applicant shall declare the exhaust air volume flow that shall be used for space heating test.

A.1.1.2. Air/air type

The testing points to be performed are the following:

- a) Bivalent temperature condition according to EN 14825 for average climate
- b) One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- c) For any other climate, bivalent temperature condition shall be tested according to EN 14825
- d) As an option, A7/A20 according to EN 14511-2 can also be tested

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A.1.2. Space cooling tests

A.1.2.1. All type except air/air

SEER and P_{design} for +7°C/+12°C and/or +18°C/+23°C applications can be certified as an option.

The testing points to be performed for the certified application are the following:

- a) "A" testing condition according to EN 14825;
- b) One other testing condition to be chosen by the certification body according to EN 14825

If both +7°C/+12°C and/or +18°C/+23°C applications are certified, the test shall be performed as described above for both applications.

If both water and brine as heat source are certified, tests shall be carried out with either brine or water as heat source; the heat source being chosen by the certification body.

For exhaust air heat pump, the applicant shall declare the exhaust air volume flow that shall be used for space cooling test.

A.1.2.2. Air/air type

The testing points to be performed are the following:

- a) Test condition "A" according to EN 14825
- b) One other testing condition to be chosen by the certification body according to EN 14825

A.1.3. Sound power level tests

A.1.3.1. All types of space heater except air/air type

Tests shall be performed according to EN 12102-1 for average climate at the certified highest temperature application.

For combination heat pumps certified for brine and water as heat source, the acoustic test is carried out using brine.

In case the heat pump is made of an indoor and an outdoor units, both outdoor and indoor units shall be tested.

A.1.3.2. Air/air type

Tests shall be performed according to EN 12102-1. Both outdoor and indoor units shall be tested where relevant. For package units, both outdoor and indoor sound power levels shall be measured.

A.1.3.3. Heat pump for hot water only

Tests shall be performed for average climate according to EN 12102-2 and with the same heat source as for performance tests.


Both outdoor and indoor units shall be tested where relevant.

A.1.4. Hot water tests

A.1.4.1. Combination heat pump and air/air heat pump providing domestic hot water

Tests shall be performed according to EN 16147 for average climate.

Tests may also be performed according to EN 16147 for any other declared climate.

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The tests shall be performed for the load profiles as declared by the applicant for each declared climate.

For water (brine)/water type, in case brine and water as heat source are declared, only one heat source shall be tested. The heat source to be tested is chosen by the certification body.

For exhaust air heat pump, the applicant shall declare the exhaust air volume flow that shall be used for hot water test.

A.1.4.2. Heat pump for hot water only

Tests shall be performed according to EN 16147 for average climate.

Tests may also be performed according to EN 16147 for any other declared climate.

The tests shall be performed for the load profiles as declared by the applicant for each declared climate.

For hot water heat pumps that can operate with several air sources (outdoor air, exhaust air; indoor air; brine, water) only one heat source shall be tested. The heat source to be tested is chosen by the certification body.

As an option, heat pump for domestic hot water can also be tested using non-heated space air conditions, i.e. +15°C (+12°C). The test under non-heated space air condition shall be conducted in addition to the test performed using a heat source defined in regulation 814/2013.

For exhaust air heat pump, the applicant shall declare the exhaust air volume flow that shall be used for hot water test.

A.1.5. Operating tests

A.1.5.1. Space heating and cooling heat pump

Operating tests shall be performed according to EN 14511-4 as follows:

- starting and operating tests
- shutting off the heat transfer medium flows,
- complete power supply failure.

In case the heat pump can be used with brine or water, only one heat source (brine or water) shall be tested.

For direct exchange type, operating tests shall be carried out according to EN 15879-1 sections as follows:


- chapter 7.1 starting tests according to Table 8
- chapter 7.2.2 pressure drop
- chapter 7.2.3 shutting off the heat transfer medium flow
- chapter 7.2.4 complete power supply failure

A.1.5.2. Heat pump for hot water only

Operating test shall be performed according to EN 16147:

- 8.1.: temperature operating range
- 8.3.: safety devices checking test
- 8.4.: condensate draining

A.1.6. SCOP and SEER calculations

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For SCOP and/or SEER calculations, certification bodies shall use the calculation tools approved by the HPSG.

For water based heat pump also certified in cooling mode, the following hours shall be used for the SEER calculation:

| j | T_j | h_j |
|----|-------|-------|
| # | °C | h |
| 1 | 17 | 205 |
| 2 | 18 | 227 |
| 3 | 19 | 225 |
| 4 | 20 | 225 |
| 5 | 21 | 216 |
| 6 | 22 | 215 |
| 7 | 23 | 218 |
| 8 | 24 | 197 |
| 9 | 25 | 178 |
| 10 | 26 | 158 |
| 11 | 27 | 137 |
| 12 | 28 | 109 |
| 13 | 29 | 88 |
| 14 | 30 | 63 |
| 15 | 31 | 39 |
| 16 | 32 | 31 |
| 17 | 33 | 24 |
| 18 | 34 | 17 |
| 19 | 35 | 13 |
| 20 | 36 | 9 |
| 21 | 37 | 4 |
| 22 | 38 | 3 |
| 23 | 39 | 1 |
| 24 | 40 | 0 |


| Mode | Symbol | Hours |
|-----------------------|-----------|-------|
| Active mode | H_{HE} | 600 |
| Off mode | P_{off} | 0 |
| Thermostat off mode | P_{to} | 659 |
| Standby mode | P_{sb} | 1377 |
| Crankcase heater mode | P_{ck} | 2036 |

A.2. Tests to be performed at admission

A.2.1. All types except air/air type

A.2.1.1. Low temperature heat pump

- space heating tests for low temperature application
- sound power level tests
- operating tests
- cooling tests shall be performed in case cooling performance are to be certified

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A.2.1.2. Medium temperature heat pump

- space heating tests for low and for medium temperature applications
- sound power level tests.
- operating tests
- cooling test shall be performed in case cooling performance are to be certified

A.2.1.3. Combination heat pump

- space heating tests for medium temperature application
- hot water tests
- sound power level tests
- operating tests
- space heating tests for low temperature application in case the low temperature application is to be certified
- cooling tests shall be performed in case cooling performance are to be certified

A.2.1.4. Heat pump for hot water only

- hot water tests
- sound power level tests
- operating tests

A.2.2. Air/air type

A.2.2.1. Air/air heat pump for space heating only

- space heating tests
- sound power level tests in heating mode for average climate
- operating tests in heating mode

A.2.2.2. Air/air heat pump for space cooling only

- space cooling tests
- sound power level tests in cooling mode
- operating tests in cooling mode

A.2.2.3. Air/air heat pump for space heating and cooling

- space cooling tests
- space heating tests
- sound power level tests in cooling mode
- operating tests in cooling mode

A.2.2.4. Air/air heat pump providing domestic hot water

- hot water tests


The hot water tests are to be performed in addition to the space cooling and/or heating tests.

A.3. Test to be performed for surveillance tests

A.3.1. All types except air/air type

A.3.1.1. Low temperature heat pump

- space heating tests for low temperature application
- sound power level tests

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- operating tests: The test is to be chosen by the certification body among the two following tests: “Shutting off the heat transfer medium flow” and “complete power supply failure”
- cooling tests shall be performed in case cooling performance are certified. In case both +7°C/+12°C and +18°C/+23°C applications are certified, only one of them is tested

A.3.1.2. Medium temperature heat pump

- space heating tests for low OR for medium temperature application
- sound power level tests
- operating tests: The test is to be chosen by the certification body among the two following tests: “Shutting off the heat transfer medium flow” and “complete power supply failure”
- cooling tests shall be performed in case cooling performance are certified. In case both +7°C/+12°C and +18°C/+23°C applications are certified, only one of them is tested

A.3.1.3. Combination heat pump

- in case only medium temperature application is certified: space heating tests for medium temperature application
- in case both low and medium applications are certified: space heating tests for low OR for medium temperature application
- hot water tests
- sound power level tests
- operating tests: The test is to be chosen by the certification body among the two following tests: “Shutting off the heat transfer medium flow” and “complete power supply failure”.
- cooling tests shall be performed in case cooling performance are certified. In case both +7°C/+12°C and +18°C/+23°C applications are certified, only one of them is tested

A.3.1.4. Heat pump for domestic hot water only

- hot water tests
- sound power tests
- operating tests: the test is to be chosen by the certification body among the two following tests: “Safety devices checking test” and “condensate draining”.


A.3.2. Air/air type

A.3.2.1. Air/air heat pump for space heating only

- space heating tests
- sound power level tests in heating mode for average climate
- operating tests in heating mode: The test is to be chosen by the certification body among the two following tests: “Shutting off the heat transfer medium flow” and “complete power supply failure”.

A.3.2.2. Air/air heat pump for space cooling only

- space cooling test
- sound power level tests in cooling mode
- operating tests in cooling mode: the test is to be chosen by the certification body among the two following tests: “Shutting off the heat transfer medium flow” and “complete power supply failure”.

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A.3.2.3. Air/air heat pump for space heating and cooling

- space cooling tests
- space heating tests
- sound power level tests in cooling mode
- operating tests in cooling mode: “Shutting off the heat transfer medium flow” and “complete power supply failure”.

A.3.2.4. Air/air heat pump also providing domestic hot water

- Hot water tests

The hot water tests are to be performed in addition to the space cooling and/or heating tests.

A.4. Rerating rules

Rerating rules only apply to heat pump certified under periodic testing approach.

Rerating rules only apply where measured performance are lower than declared performance, unless specify differently. In case measured performance are higher than declared performance, unless specify differently, the test is passed and the declared performance remain unchanged.

A.4.1. General rules

- when a performance test is “failed” the rerating rules apply to the corresponding performance of all the models in the sub-type in which the tested unit belongs to.
 - for the performances non-listed in the Scheme Rules clause 7 that are tested (eg: EN 14511-2 performances), in case measured data don't match with declared data, the rerating rules apply to all the models in the sub-type in which the tested unit belongs to.
 - several operating modes are tested during surveillance tests: acoustic, heating, cooling and DHW. Rerating rules apply independently to each mode and to the characteristics for which the tolerances are set in the scheme rules clause 7. that has failed within this mode
- ⇒ E.g.: failure on outdoor unit sound power level test leads to rerating of sound power level of the outdoor unit of the models of the considered sub-type.

A.4.2. Space heating/cooling performances rerating rules

A.4.2.1. Performances according to EN 14511-2 or to EN 15879-1

Tolerance on heating capacity and COP measured at standard rating conditions according to EN 14511-2 is equal to -8% of the declared value.

If both the measured heating capacity and COP are not lower than 8% compared to declared values, then the EN 14825 tests shall be performed according the flowrate declared by the applicant.

If an observed deviation between declared and measured heating capacity or COP exceeds - 8 %, then EN 14825 tests shall be performed according to the measured flowrate and the EN 14511-2 declared performances shall be rerated as follows:

- Rerating of tested model


rerated heating capacity = measured capacity × (1 + 0.08)

Equation 1

rerated COP = measured COP × (1 + 0.08)

Equation 2

- Rerating of the other models of the sub-type

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Same relative deviation in between declared and rerated heating capacity of the tested model shall be applied to the heating capacity of the other models of the sub-type.

Same relative deviation in between declared and rerated COP of the tested model shall be applied to the COP of the other models of the sub-type.

- Input power rerating for all models

$$\text{rerated input power} = \frac{\text{rerated heating capacity}}{\text{rerated COP}} \quad \text{Equation 3}$$

A.4.2.2. Performances according to EN 14825 Space heating

The rerating rules apply independently to each declared climate

In case a test in heating mode is “failed” and in case of two heat sources are declared, both heat sources shall be rerated unless the certificate holder asks for a full test on both heat sources for all the declared temperature applications for the failed climate. A full test means: test according to EN 14511-2, test according to EN 14825 at every part load conditions and test of an auxiliary mode chosen by the certification body.

For the space heating test to be considered as “passed” the space heating tests for all declared climates need to be “passed”.

A.4.2.3. Test at bivalent temperature condition

Bivalent temperature condition shall be tested first. If the measured heating capacity at T_{biv} fulfils the following criteria:

$$P_j[T_{biv}] = \frac{T_{biv}-16}{T_{designh}-16} P_{declared\ Pesignh} \pm 10\% \quad \text{Equation 4}$$

then the test continues. If not, the test is interrupted. The certificate holder shall provide a new complete set of declared values to the certification body and to the recognised testing laboratory within two weeks after the interrupted test. The tests may then be restarted from the beginning and the $P_{designh}$ shall be rerated as follows:

- Rerating of the tested model:

$$\text{rerated } P_{designh} = P_j[T_{biv}] \times \frac{T_{designh}-16}{T_{biv}-16} \quad \text{Equation 5}$$

- Rerating of the other models of the sub-type and of the other heat source when relevant:

Same relative deviation between declared and rerated $P_{designh}$ of the tested model shall be applied to all other models of the sub-type and to the other heat source when relevant.

When test at bivalent temperature condition has been completed, the other selected part loads shall be tested; if any.


Rules described in paragraph b) of 4.2.2.1.2. apply to COP measured at T_{biv} .

A.4.2.4. Test at other part load conditions

- a) Heating capacity

- Part load condition where the temperature is below T_{biv}

At each part load condition where the temperature is below T_{biv} , the measured heating capacity shall not be lower than -8% nor be higher than +8% of the declared heating capacity $P_{dh}(T_j)$. If

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the measured heating capacity is not within $\pm 8\%$ of $P_{dh}(T_j)$, then $P_{dh}(T_j)$ shall be rerated as follow:

- Rerating of the tested model

$$\text{rerated } P_{dh}(T_j) = \text{measured } P_{dh}(T_j) \times (1 + 0.08) \quad \text{Equation 6}$$

If the measured heating capacity is below the declared capacity, or

$$\text{rerated } P_{dh}(T_j) = \text{measured } P_{dh}(T_j) \times (1 - 0.08) \quad \text{Equation 7}$$

If the measured capacity is above the declared capacity.

The rerated heating capacity is the one to be considered for the SCOP calculation.

- Rerating of the other models of the sub-type and of the other heat source when relevant:

Same relative deviation in between declared and rerated $P_{dh}(T_j)$ of the tested model shall be applied to the $P_{dh}(T_j)$ (corresponding to the tested part load) of all other models of the sub-type and the other heat source when relevant.

- Part load condition where the temperature is above or equal T_{biv}

At each part load condition where the temperature is above or equal to T_{biv} , if the measured heating capacity is below -10% of the heating load $P_h(T_j)$ the test is interrupted and the certificate holder shall provide a new complete set of declared values to the certification body and to the recognised testing laboratory within two weeks after the interrupted test. The test is restarted from the start.

If the measured heating capacity is not below -10% of the heating load $P_h(T_j)$ and if the measured heating capacity is within $\pm 8\%$ of the declared heating capacity $P_{dh}(T_j)$, then $P_{dh}(T_j)$ is considered as being valid and is used for the calculation of the SCOP.

If the measured heating capacity is not within $\pm 8\%$ of $P_{dh}(T_j)$, then $P_{dh}(T_j)$ shall be rerated as follow:

- Rerating of the tested model

$$\text{rerated } P_{dh}(T_j) = \text{measured } P_{dh}(T_j) \times (1 + 0.08) \quad \text{Equation 8}$$

If the measured heating capacity is below the declared capacity, or

$$\text{rerated } P_{dh}(T_j) = \text{measured } P_{dh}(T_j) \times (1 - 0.08) \quad \text{Equation 9}$$

If the measured capacity is above the declared capacity.

The rerated heating capacity is the one to be considered for the SCOP calculation.


- Rerating of the other models of the sub-type and of the other heat source when relevant:

Same relative deviation in between declared and rerated $P_{dh}(T_j)$ of the tested model shall be applied to the $P_{dh}(T_j)$ (corresponding to the tested part load) of all other models of the sub-type and the other heat source when relevant.

b) Declared COP and SCOP

At each part load condition, measured COP shall not be lower than -8% compared to the declared COP.

- If each measured COP is within the tolerance, the declared COP for each part load condition and the declared auxiliary mode consumptions are used for the calculation of the SCOP. If the calculated SCOP is not lower than -8% compared to the declared SCOP, then the test is over and nor SCOP nor η are rerated. If the calculated SCOP is lower than -8% compared to the declared SCOP, the declared SCOP and η shall be rerated. The rerated SCOP and η shall be equalled to the calculated ones. SCOP and

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η for each models of the sub-type for each declared applications and each declared climates shall be calculated according the declared part load data and auxiliary modes consumption. Each SCOP being lower than the calculated value -8% shall be replaced by the calculated SCOP and η shall be recalculated accordingly

- If at least one of the measured COP is lower than -8% compared to the declared COP then, all the non-tested part load conditions and one auxiliary mode condition (chosen by the certification body) shall be tested. SCOP is calculated using the declared COP and/or declared heating capacities when they are within the 8% tolerance (rules for heating capacities as described in the above paragraph apply), otherwise using the measured heating capacities and/or COP. For the calculation, the measured auxiliary mode consumption and the declared values for the modes that have not been tested shall be considered
 - If the calculated SCOP is not lower than -8% compared to the declared SCOP, SCOP and η are not rerated and the COP at part load remain unchanged.
 - If the calculated SCOP is lower than -8% compared to the declared SCOP then, SCOP and η shall be rerated and all the other declared applications shall be fully tested at every part load conditions and one auxiliary mode chosen by certification body. The same rerating procedure applies to each application
 - Rerating of tested model

$$\text{rerated SCOP} = \text{measured SCOP} \times (1 + 0.08)$$

Equation 10

Rerated η is recalculated according rerated SCOP.

The COP at each part load shall be rerated as well and correspond to the measured COP at each part load condition. Auxiliary mode consumptions remain unchanged except for the one being tested and if the measured value is not within the tolerance with the declared value.

Rerating of all other models of the sub-type and of the other heat source when relevant Same relative deviation in between declared and rerated SCOP of the tested model shall be applied to the SCOP of all other models of the sub-type and the other heat source when relevant.

η is recalculated according rerated SCOP.

The declared COP at each part load shall be revised to ensure consistency with the rerated SCOP.


Heating test is “passed” if none of the P_{designh} , heating capacity at part load and η for all tested applications has been rerated.

A.4.2.5. Space cooling

a) Condition A test

Condition A is tested. If cooling capacity measured under condition A does not deviate from P_{designc} from more than -8% then the test continues. If not, the test is interrupted. The certificate holder shall provide a new complete set of declared values to the certification body and the chosen recognised testing laboratory within two weeks of the interrupted test. The tests may then be restarted from the beginning and the P_{designc} shall be rerated as follows:

- For the tested model:

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$$\text{rerated } P_{\text{designnc}} = P_{\text{dc}}(35)$$

Equation 11

- For the other models of the sub-type, same deviation in between declared and rerated P_{designnc} of the tested model shall be applied.

When test at A temperature condition is completed, the other selected part load condition shall be tested.

b) Test at other part load conditions

At each of the part load conditions, measured EER shall not be lower than -8% compared to the declared EER.

- If all measured EER values are within the tolerance, SEER is calculated using the declared EER values for all part load conditions and declared auxiliary modes consumptions.
- If at least one of the measured EER is lower than -8% compared to the declared EER then, all non-tested part load conditions and one auxiliary mode condition (chosen by the certification body) shall be tested. SEER is then calculated using the declared EER values when they are within the 8% tolerance, otherwise using the measured values and the measured auxiliary mode consumption and the other declared auxiliary mode consumptions for those not tested.

If the calculated SEER is not lower than -8% compared to the declared SEER, SEER is not rerated

If the calculated SEER is lower than -8% compared to the declared SEER then, SEER shall be rerated.

- Rerating of tested model

$$\text{rerated SEER} = \text{measured SEER}$$

Equation 12

The EER at each part load shall be rerated as well and correspond to the measured EER at each part load condition. Auxiliary mode consumptions remain unchanged except for the one being tested and if the measured value is not within the tolerance with the declared value.

- Rerating of the other models of the sub-type

Same relative deviation in between declared and rerated SEER of the tested model shall be applied to the SEER of all other models of the sub-type.


Cooling test is “passed” if neither P_{designnc} nor SEER has been rerated.

A.4.3. Domestic hot water performances rerating rules

The rerating rules apply independently to each declared climate.

In case the test is “failed” and in case several heat sources are declared, all heat sources shall be rerated unless the certificate holder asks for a full performance test on the non-tested heat source.

If the test cannot fulfil the requirements of EN 16147 in term of water temperature; the certificate holder shall provide a new complete set of declared values: load profile; η_{DHW} and V_{40} (only for DHW heat pumps) to the certification body and the chosen recognised testing laboratory within two weeks of the interrupted test. The tests may then be restarted from the beginning.

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DHW test is “passed” if for each declared climate the test has been performed for the declared load profile and if neither η_{DHW} nor V_{40} has been rerated, otherwise the test is “failed”.

A.4.3.1. η_{DHW}

If an observed deviation between declared and measured η_{DHW} exceeds -8 % of the declared value, then η_{DHW} shall be rerated.

- Rerating of tested model

$$\text{rerated } \eta_{DHW} = \text{measured } \eta_{DHW} \times (1 + 0.08) \quad \text{Equation 13}$$

- Rerating of the other models of the sub-type and of the other heat source when relevant
Same relative deviation in between declared and rerated η_{DHW} of the tested model shall be applied to the η_{DHW} of all other models of the sub-type and for the other heat source when relevant.

A.4.3.2. V_{40} – only for domestic hot water heat pumps

If an observed deviation between declared and measured V_{40} exceeds -3 % of the declared value, then V_{40} shall be rerated.

- Rerating of tested model

$$\text{rerated } V_{40} = \text{measured } V_{40} \times (1 + 0.03) \quad \text{Equation 14}$$

- Rerating of the other models of the sub-type and of the other heat source when relevant
Same relative deviation in between declared and rerated V_{40} of the tested model shall be applied to the V_{40} of all other models of the sub-type and for the other heat source when relevant.

A.4.3.3. Heating up period

In case the measured duration of heating up period exceeds the declared value by more than 8% or at least 15 minutes, then the heating up period shall be rerated.

In case the limit of 15 minutes exceeds the deviation of 8%, equation (15) applies. In case the deviation of 8% exceeds the limit of 15 minutes, equation (16) applies.

- Rerating of tested model

$$\text{rerated heating up period} = \text{measured heating up period} - 15 \text{ minutes} \quad \text{Equation 15}$$


$$\text{rerated heating up period} = \text{measured heating up period} \times (1 - 0.08) \quad \text{Equation 16}$$

- Rerating of all other models of the sub-type and of the other heat source when relevant
Same deviation (in minutes) in between declared and rerated heating up period of the tested model shall be applied to the heating up period of all other models of the sub-type and for the other heat source when relevant.

A.4.3.4. P_{es}

Tolerance is equal to +10% of the declared value.

- Rerating of tested model

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$$\text{rerated } P_{es} = \text{measured } P_{es} \times (1 - 0.1)$$

Equation 17

○ Rerating of all other models of the sub-type and of the other heat source when relevant
 Same relative deviation in between declared and rerated P_{es} of the tested model shall be applied to the P_{es} of all other models of the sub-type and for the other heat source when relevant.

A.4.3.5. Reference temperature

If an observed deviation between declared and measured reference temperature exceed -1K of the declared value, then the reference temperature shall be rerated.

- Rerating of tested model

$$\text{rerated reference temperature} = \text{measured reference temperature} + 1$$

Equation 18

- Rerating of all other models of the sub-type and for the other heat source when relevant

Same deviation (in Kelvin) in between declared and reference temperature of the tested model shall be applied to the reference temperature of all other models of the sub-type and for the other heat source when relevant.

A.4.3.6. V_{40} (for combination heat pump)

If an observed deviation between declared and measured V_{40} exceed -3% of the declared value, then the V_{40} shall be rerated.

- Rerating of tested model

$$\text{rerated } V_{40} = \text{measured } V_{40} \times (1 + 0.03)$$

Equation 19

- Rerating of all other models of the sub-type and of the other heat source when relevant

Same relative deviation in between declared and rerated V_{40} of the tested model shall be applied to the V_{40} of all other models of the sub-type and for the other heat source when relevant.

A.4.4. Sound power level rerating rules

The rerating rules apply independently to indoor and outdoor units.

In case the test is “failed” and in case several heat sources are declared, all heat sources shall be rerated unless the certificate holder asks for a full test on the non-tested heat source.

Sound power level test is “passed” if neither indoor unit (when relevant) nor outdoor unit (when relevant) has been rerated.

If measured sound power level is higher than declared sound power level is more than 2 dB(A) higher than the declared value, the following rerating rules apply:

- Rerating of tested model


$$\text{rerated sound power level} = \text{measured sound power level} - 2$$

Equation 20

- Rerating of all other models of the sub-type and for the other heat source when relevant


Same absolute deviation in between declared and rerated sound power level of the tested model shall be applied to the sound power level of all other models of the sub-type and for the other heat source when relevant.

Sound power test is “passed” if neither outdoor nor indoor unit, where relevant, sound power level has been rerated; otherwise, the test is “failed”.

| | | |
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A.4.5. Operating tests

In case operating test failed, certificate holder shall provide the certification body with corrective actions within one month after the failed test was performed.

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B. Hybrid heat pumps

Hybrid heat pump application shall be conducted using one-off admission testing approach.

Admission test description

B.1.Space heating hybrid heat pump (cooling in option)

B.1.1. Space heating tests

Space heating test shall be performed according to the combined test method described in EN 14825. In the scope of the HP-KEYMARK certification, the separate test method cannot be applied.

If both water and brine as heat sources are certified, tests shall be carried out with both heat sources.

For each low and medium temperature applications, the following tests shall be performed:

- a) A7/W35/55; A20/W35/55; B0/W35/55; W10/W35/55; according to EN 14511-2 and E4/W35/55 according to EN 15879-1
- b) Design temperature condition for average climate (-10°C)
- c) Switch temperature boiler off condition according to EN 14825 for average climate
- d) One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- e) For any other climate, switch temperature boiler off condition shall be tested according to EN 14825

B.1.2. Sound power level tests

Tests shall be performed according to EN 12102-1 for average climate at medium temperature application.

For heat pumps certified for brine and water as heat sources, the sound power level test is performed using brine.

B.1.3. Operating tests

Operating tests shall be performed according to EN 14511-4 as follows:

- starting and operating tests
- shutting off the heat transfer medium flows
- complete power supply failure.


In case the heat pump can be used with brine or water, only one heat source (brine or water) shall be tested.

For direct exchange units operating tests shall be performed according to EN 15879-1 clauses as follows:

- chapter 7.1 starting test according to Table 8
- chapter 7.2.2 pressure dropchapter 7.2.3 shutting of the heat transfer medium flowchapter 7.2.4 complete power supply failure

B.1.4. Air flow for exhaust air hybrid heat pumps

The applicant shall declare the exhaust air volume flow that shall be used for space heating test.

| | | |
|--|---|--|
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B.1.5. Space cooling tests

SEER and $P_{designc}$ for +7°C/+12°C and/or +18°C/+23°C applications can be certified as an option.

The testing points to be performed for the certified application are the following:

- "A" testing condition according to EN 14825;
- One other testing condition to be chosen by the certification body according to EN 14825

If both +7°C/+12°C and/or +18°C/+23°C applications are certified, the test shall be performed as described above for both applications.

If both water and brine as heat sources are certified, tests shall be carried out with either brine or water as heat source; the heat source being chosen by the certification body.

For exhaust air heat pump, the applicant shall declare the exhaust air volume flow that shall be used for space cooling test.

B.2. Combination hybrid heat pump

B.2.1. Space heating test

If both water and brine as heat sources are certified, tests shall be carried out with both heat sources.

- A7/W55; A20/W55; B0/W55; W10/W55 according to EN 14511-2 and E4/W55 according to EN 15879-1.
- Design temperature condition for average climate (-10°C)
- Switch temperature boiler off condition according to EN 14825 for average climate
- One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- For any other climate, Switch temperature boiler off condition shall be tested according to EN 14825

Low temperature application can be certified as an option; in this case, testing at low temperature application shall be performed as follows:

- A7/W35; A20/W35; B0/W35; W10/W35 according to EN 14511-2 and E4/W35 according to EN 15879-1.
- Design temperature condition for average climate (-10°C)
- Switch temperature boiler off condition according to EN 14825 for average climate
- One other testing condition to be chosen by the certification body according to EN 14825 for average climate
- For any other climate, Switch temperature boiler off condition shall be tested according to EN 14825


B.2.2. Sound power level tests

Tests shall be carried out according to EN 12102-1 for medium temperature application for average climate.

For heat pumps certified for brine and water as heat sources, the acoustic test is carried out using brine.

B.2.3. Domestic hot water tests

Tests shall be performed for average climate according to EN 16147 in case the domestic hot water is produced by the heat pump only, and to EN13203-5 in case the boiler is contributing to the domestic hot water production..

| | | |
|--|--------------------------|---|
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For any other declared climate, test may also be performed by using the relevant standard, EN 16147 or EN 13203-5, depending on any contribution of the boiler or not.

The tests shall be performed for the load profiles as declared by the applicant for each climate where relevant.

For water (brine)/water type, in case brine and water as heat sources are declared, only one heat source shall be tested. The heat source to be tested is chosen by the certification body.

B.2.4. Operating tests

Operating tests shall be performed according to EN 14511-4 as follows:

- starting and operating tests
- shutting off the heat transfer medium flows,
- complete power supply failure.

In case the heat pump can be used with brine or water, only one heat source (brine or water) shall be tested.

For direct exchange units operating tests shall be performed according to EN 15879-1 clauses as follows:

- chapter 7.1 starting tests according to Table 8
- chapter 7.2.2 pressure drop
- chapter 7.2.3 shutting off the heat transfer medium flow
- chapter 7.2.4 complete power supply failure

B.2.5. Space cooling tests

SEER and P_{designc} for +7°C/+12°C and/or +18°C/+23°C applications can be certified as an option.

The testing points to be performed for the certified application are the following:

- a) "A" testing condition according to EN 14825;
- b) One other testing condition to be chosen by the certification body according to EN 14825

If both +7°C/+12°C and/or +18°C/+23°C applications are certified, the test shall be performed as described above for both applications.

If both water and brine as heat sources are certified, tests shall be carried out with either brine or water as heat source; the heat source being chosen by the certification body.

For exhaust air heat pump, the applicant shall declare the exhaust air volume flow that shall be used for space cooling test.


B.3. SCOP and SEER calculations

For SCOP and SEER calculations, certification bodies shall use the calculation tool approved by the HPSG.

For the SCOP calculation, hours defined in EN14825 annex B shall be used.


For heat pump also certified in cooling mode, the following hours shall be used for the SEER calculation:

| j | T_j | h_j |
|---|-------|-------|
| # | °C | h |
| 1 | 17 | 205 |
| 2 | 18 | 227 |

| | | |
|--|--------------------------|---|
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| | | |
|----|----|-----|
| 3 | 19 | 225 |
| 4 | 20 | 225 |
| 5 | 21 | 216 |
| 6 | 22 | 215 |
| 7 | 23 | 218 |
| 8 | 24 | 197 |
| 9 | 25 | 178 |
| 10 | 26 | 158 |
| 11 | 27 | 137 |
| 12 | 28 | 109 |
| 13 | 29 | 88 |
| 14 | 30 | 63 |
| 15 | 31 | 39 |
| 16 | 32 | 31 |
| 17 | 33 | 24 |
| 18 | 34 | 17 |
| 19 | 35 | 13 |
| 20 | 36 | 9 |
| 21 | 37 | 4 |
| 22 | 38 | 3 |
| 23 | 39 | 1 |
| 24 | 40 | 0 |

| Mode | Symbol | Hours |
|-----------------------|-----------|-------|
| Active mode | H_{HE} | 600 |
| Off mode | P_{off} | 0 |
| Thermostat off mode | P_{to} | 659 |
| Standby mode | P_{sb} | 1377 |
| Crankcase heater mode | P_{ck} | 2036 |

| | | |
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|  | Heat Pump KEYMARK | |
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C. Gas heat pumps

Gas heat pump application shall be conducted using one-off admission testing approach.

Admission test description

C.1. Space heating tests for low temperature heat pumps

If both water and brine as heat sources are certified, tests shall be carried out with both heat sources.

- A7/W35; A20/W35; B0/W35; W10/W35 according to EN 12309-4, EN 16905-4; EN 16905-4 or EN 16905-3
- Bivalent temperature condition for average climate according EN 12309-4, EN 12309-6, EN 16905-4 or EN 16905-3 for gas heat pumps
- One other testing condition for average climate to be chosen by the certification body according to EN 12309-4; EN 12309-6, EN 16905-4 or EN 16905-3 for gas heat pumps
- For any other climate, bivalent temperature condition shall be tested according to EN 12309-4, EN 12309-6, EN 16905-4 or EN 16905-3 for gas heat pumps

C.2. Space heating tests for medium temperature heat pump

If both water and brine as heat sources are certified, tests shall be carried out with both heat sources.

For each low and medium temperature application, the following tests shall be performed:

- A7/W35/55; A20/W35/55; B0/W35/55; W10/W35/55; according to EN 12309-4, EN 12309-6, EN 16905-4 or EN 16905-3
- Bivalent temperature condition for average climate according to EN 12309-4, EN 12309-6, EN 16905-4 or EN 16905-3
- One other testing condition for average climate to be chosen by the certification body according to EN12309-4, EN12309-6, EN16905-4 or EN16905-3
- For any other climate, bivalent temperature condition shall be tested according to EN12309-4, EN12309-6, EN16905-4 or EN16905-3

C.3. Sound power level tests

Tests shall be performed according to EN 12102-1 for average climate at the certified highest temperature application.

For heat pumps certified for brine and water as heat sources, the sound power level test shall be performed using brine.

C.4. Air flow for exhaust air heat pumps


The applicant shall declare the exhaust air volume flow that shall be used for space heating test.

C.5. Space cooling tests

SPERc and $P_{designc}$ for +7°C/+12°C and/or +18°C/+23°C applications can be certified as an option.

If both water and brine as heat sources are certified, tests shall be carried out with either brine or water as heat source; the heat source being chosen by the certification body.

- Only one cooling application is certified

| | | |
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- a) "A" testing condition according to EN12309-4, EN12309-6, EN16905-4 or EN16905-3
 b) One other testing condition to be chosen by the certification body to EN12309-4, EN12309-6, EN16905-4 or EN16905-3


- Both cooling applications are certified
- a) "A" testing condition according to EN12309-4, EN12309-6, EN16905-4 or EN16905-3
 b) One other testing condition from one of the 2 applications to be chosen by the certification body according to EN12309-4, EN12309-6, EN16905-4 or EN16905-3

C.6. SPER_h and SPER_c calculations

SPER_h shall be calculated using the hours defined in the corresponding standard.
 For heat pump also certified in cooling mode, the following hours shall be used for the SPER_c calculation:


| j | T _j | h _j |
|----|----------------|----------------|
| # | °C | h |
| 1 | 17 | 205 |
| 2 | 18 | 227 |
| 3 | 19 | 225 |
| 4 | 20 | 225 |
| 5 | 21 | 216 |
| 6 | 22 | 215 |
| 7 | 23 | 218 |
| 8 | 24 | 197 |
| 9 | 25 | 178 |
| 10 | 26 | 158 |
| 11 | 27 | 137 |
| 12 | 28 | 109 |
| 13 | 29 | 88 |
| 14 | 30 | 63 |
| 15 | 31 | 39 |
| 16 | 32 | 31 |
| 17 | 33 | 24 |
| 18 | 34 | 17 |
| 19 | 35 | 13 |
| 20 | 36 | 9 |
| 21 | 37 | 4 |
| 22 | 38 | 3 |
| 23 | 39 | 1 |
| 24 | 40 | 0 |

| Mode | Symbol | Hours |
|-----------------------|------------------|-------|
| Active mode | H _{HE} | 600 |
| Off mode | P _{off} | 0 |
| Thermostat off mode | P _{to} | 659 |
| Standby mode | P _{sb} | 1377 |
| Crankcase heater mode | P _{ck} | 2036 |

| | | |
|--|--------------------------|---|
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C.7.NOx emissions

NOx emissions shall be measured according the appropriate standard.

| | | |
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D. CO₂ Heat pump for domestic hot water

CO₂ heat pump application shall be conducted using one-off admission testing approach.

This section applies to CO₂ heat pumps designed for domestic hot water production placed on the market without a storage tank.

Admission test description

D.1. Performance test

If both water and brine as heat sources are certified, tests shall be carried out with both heat sources.

The test shall be conducted following the EN14511-3 test procedure and using the following set of conditions depending on the heat source:

Table D.1. – Test conditions for performance test of CO₂ heat pumps

| Heat source | | | | inlet water temperature | Outlet water temperature |
|-------------------------|-------------|----------|------------|-------------------------|--------------------------|
| Type | Temperature | | | | |
| | Average | Colder | Warmer | | |
| Air (dry bulb/wet bulb) | 7°C(6°C) | 2°C(1°C) | 14°C(13°C) | 15°C | 60°C |
| Water | 10°C | | | | |
| Brine | 0°C | | | | |
| Exhaust air | 20°C (12°C) | | | | |

The test shall be conducted for each declared climate.

For heat pump using exhaust air as heat source; the applicant shall declare the exhaust air volume flow that shall be used for the performance test.

D.2. Sound power level test

Tests shall be performed according to EN 12102-1 for average climate at the inlet and outlet water temperature conditions defined in the above Table D.1.


For heat pumps certified for brine and water as heat sources, the sound power level test is performed using brine.

D.3. Operating tests

Operating tests shall be performed according to EN 14511-4 as follows:

- starting and operating tests
- shutting off the heat transfer medium flows,
- complete power supply failure.

In case the heat pump can be used with brine or water, only one heat source (brine or water) shall be tested.

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E. Models within the same subtype having non identical performance

E.1. Background

Applicants may declare several models within a single subtype which have non-identical performance. The deviation between two or more models may concern:

- the performance according to EN14511-2 (heating and/or cooling mode)
- the performance according to EN14825 (heating and/or cooling mode)
- the performance according to EN16147 (non-identical tapping profile)
- the performance according to EN12102-1
- some models may be certified only for average climate whereas other models are certified also for colder and/or warmer climates.

The consequence arising from the above described situations is that testing one model does not allow the declared performance of the other models to be verified.

E.2. Admission test

E.2.1. Certification of a new subtype

This section applies if the following four conditions are occurring simultaneously:

- the subtype is not yet certified
- a test is needed for the admission process of the new subtype
- the subtype encompasses several models
- the models do not show identical performance.

Model A is being selected for the test. Model A is tested according the procedure described in part A of this document. For every additional model not showing identical performance to these of model A, additional tests are to be performed:

| Non identical performance | EN14511-2 | EN14825 | EN12102-1 | EN16147 | Colder / warmer climate | Space cooling or space heating |
|---------------------------|-----------|--|-----------|---------|---|---|
| Model x | | One test at T_{biv} (application to be chosen by the CB) | x | x | In case model A is not certified for these climates, the test procedure according to part A for colder and warmer climate applies | In case model A is not certified for space cooling or space heating, the test procedure according to part A for cooling or heating mode applies |


As all models have the same refrigerating circuit, the additional tests are performed on model A using the setting corresponding to model X.

For heat pumps being certified for both brine and water as heat source, only one heat source, chosen by the certification body, shall be tested.

E.2.2. Addition of a model to an existing subtype

This section applies if the following three conditions are occurring simultaneously:

- the subtype is already certified

| | | |
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- the model(s) to be added to the subtype does not show identical performance with the model(s) already certified
- a test is needed for the certification. When a model showing non identical performance is to be added to an already certified subtype, the sampling rules as described in the scheme rules apply to the model.

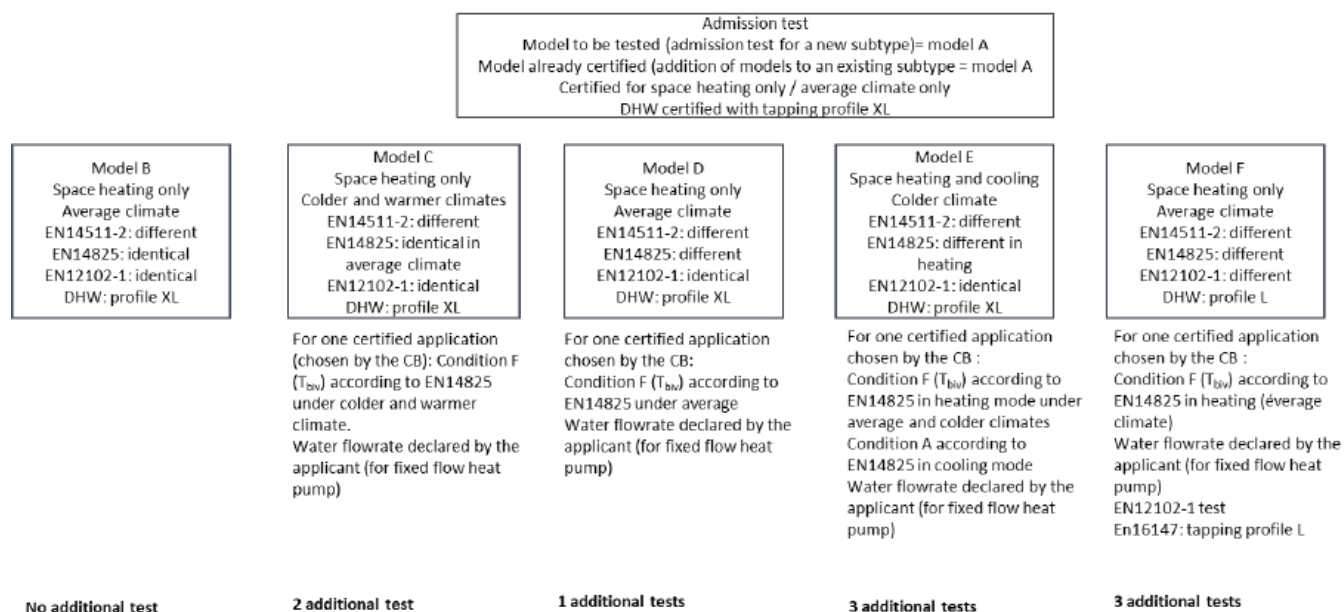
The model(s) to be added do not show the identical performance with the model A already certified. For every additional model not showing identical performance to these of model A, additional tests are to be performed:


| Non identical performance | EN14511-2 | EN14825 | EN12102-1 | EN16147 | Colder / warmer climate | Space cooling or space heating |
|---------------------------|-----------|--|-----------|---------|---|---|
| Model x | | One test at T_{biv} (application to be chosen by the CB) | x | x | In case model A is not certified for these climates, the test procedure according to part A for colder and warmer climate applies | In case model A is not certified for space cooling or space heating, the test procedure according to part A for cooling or heating mode applies |

As all models have the same refrigerating circuit, the additional tests are performed on model x using the setting corresponding to the other model(s) to be added to the subtype.

For heat pumps being certified for both brine and water as heat source, only one heat source, chosen by the certification body, shall be tested.

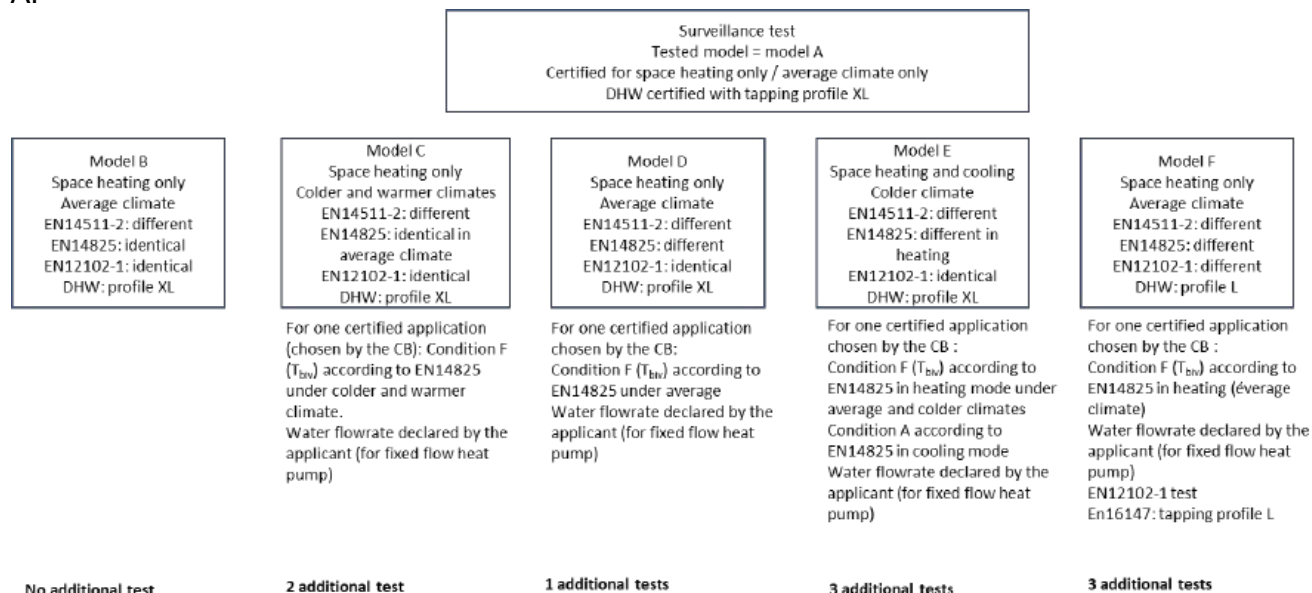
E.2.3. Example of test to be performed



| | | |
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E.3. Surveillance tests

Same test rules as of admission tests apply. In case two applications are certified, tests are performed according to the application chosen by the certification for tests performed on model A.



As all models have the same refrigerating circuit, then the additional tests are performed on model A using the setting corresponding to the other models.

For heat pumps being certified for both brine and water as heat source, only one heat source, chosen by the certification body, shall be tested.

E.4. Rerating rules

Each tested performance of each model will be rerated independently.

In case EN12102-1, EN14511-1 (space heating and/or cooling mode), EN14825 (space heating and/or cooling mode), EN16147 surveillance test failed: all model showing identical performance are rerated for the corresponding application and climate.

EHPA Testing Regulation

Testing of Air/Water Heat Pumps

Terms, Test Conditions and Test Method based on EN 14825, EN 14511-1 to 4 and EN 12102-1

Additional requirements for granting the international quality label for heat pumps



Version 2.4
Release 28.08.2020

Revisions of the document

| Version | Date | Main changes | Clause | Page | Author |
|---------|--------------|---|--------|---------|--------------|
| 2.2 | July 2015 | Initial version | | - | M. Mondot |
| 2.3 | April 2016 | Table of modifications | - | page 2 | M. Mondot |
| | | Suppression of the transitional period | | page 4 | |
| | | Dates of the applicable standards | 3 | page 4 | |
| | | Clarification of the determination of water flow rates | 6.1 | page 6 | |
| 2.4 | Oktober 2020 | Combination of 6.6 Testing the operating range and 6.7 Safety tests | 6.6 | page 8 | C. Koefinger |
| | | Removal of 6.7 Safety tests | 6.7 | page 10 | C. Koefinger |
| | | Removal of A2/W35 | | page 4 | C. Koefinger |
| | | Clarification on temperature applications | 6.2.1 | page 6 | C. Koefinger |
| | | Shift of 6.4 to the main QL document | 6.4 | page 8 | C. Koefinger |

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1. Introduction

This regulation specifies the terms and definitions, the test conditions, the performance tests and other requirements for granting the EHPA Quality Label to air-to-water heat pumps for space heating.

The test conditions and testing methods and requirements described in this regulation are based on the European standards EN 12102-1, EN 14825 and EN 14511 - Parts 1 to 4 and on additional specifications referenced herein. Anything not defined in this test regulation shall be considered regarding EN 14825, EN 14511 and EN 12102-1.

A heat pump can be awarded with the International Heat Pump Quality Label once it is successfully tested in accordance with this regulation. The process is described in the “EHPA regulations for granting the international quality label for electrically driven heat pumps”.

This regulation has been adopted by the EHPA Quality Label Committee. Any changes to them must be approved by the Committee.

2. Scope of the regulation

This regulation applies to the testing of factory-made electrically driven air-to-water heat pumps for space heating.

In order to qualify for the EHPA Quality Label, the heat pump submitted for testing must be from series production.

3. Scope of the regulation

The latest edition of the reference standards (including any amendments) applies.

EN 14825

Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance

EN 14511

Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling

Part 1: Terms and definitions

Part 2: Test conditions

Part 3: Test method

Part 4: Requirements

EN 12102-1

Air conditioners, heat pumps and dehumidifiers with electrically driven compressors – Measurement of airborne noise – Determination of the sound power level

4. Scope of the regulation

The terms and definitions given in EN 14825, EN 14511-1 and EN 12102-1 apply.

5. Performance data to be declared by the manufacturer

When applying for the EHPA Quality label for air-to-water heat pumps, the manufacturer shall provide the performance data for all climates which are declared for the Energy Labelling, i.e.:

- Average, colder and warmer,
- or
- Average and warmer.

The performance data to be declared on the application form are as follows:

1. Temperature application: low-temperature and/or medium temperature
2. Fixed water flow / variable water flow
3. Fixed outlet temperature / variable outlet temperature
4. Electric power consumptions in other modes than active mode: P_{OFF} , P_{SB} , P_{TO} and P_{CK}
5. Per Climate
 - a. $P_{designh}$ at $T_{designh}$
 - b. Bivalent temperature, $T_{bivalent}$, where applicable
 - c. Type of back up heater electric or fossil fuel, where applicable
 - d. Operating limit temperature, TOL
 - e. Performance data for test conditions A to G according to Table 1
 - f. $SCOP_{on}$ and SCOP

Table 1 – Performance data for each climate / temperature application to be declared by the manufacturer

| Test condition | Outdoor temperature °C | Outlet water temperature °C | Declared capacity DC (kW) | Declared COP COP _d | Degradation factor C _{dh} ¹ |
|----------------|------------------------|-----------------------------|---------------------------|----------------------------------|--|
| A | -7(-8) | | | | |
| B | 2(1) | | | | |
| C | 7(6) | | | | |
| D | 12(11) | | | | |
| E ² | TOL | | | | |
| F ³ | ¹ bivalent | | | | |
| G ⁴ | -15 | | | | |

¹ where applicable, because of On/Off capacity cycling

² in case TOL < $T_{designh}$ the performance data shall be declared at TOL= $T_{designh}$

³ where applicable

⁴ Only for colder climate and if TOL < -20°C

6. Tests to be performed

To be granted the heat pump shall perform the following tests:

- a) Performance tests (see chapter 6.1)
- b) Seasonal performance tests and SCOP calculations (see chapter 6.2),
- b) Acoustic test (see chapter 6.4)
- c) Testing operating range and safety tests (see chapter 6.5)

6.1 Performance tests

Performance tests shall be made in accordance with EN 14511 for the determination of the heating capacity and COP at the test conditions given in Table 2.

Table 2 – Test conditions for performance tests

| Temperature application | N° | Test condition | Heat source | | Heat sink | |
|-------------------------|----|----------------|---------------------------------|---------------------------------|------------------------|-------------------------|
| | | | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | Outlet temperature (°C) |
| Low temperature | 1 | A7/W35 | 7 | 6 | 30 | 35 |
| Medium temperature | 2 | A7/W55 | 7 | 6 | 47 | 55 |

Performance test n°1 is required for units with fixed flow rate to determine the water flow rate to be used for seasonal performance tests at low temperature application.

Performance test n°2 is required for units with fixed flow rate to determine the water flow rate for seasonal performance tests at medium temperature application, where applicable.

6.2 Seasonal performance tests and SCOP calculation

6.2.1 Declared capacity and COP

6.2.1.1 Average climate –low temperature application

The seasonal performance tests shall be performed in all the A to G conditions, where applicable, as specified in Table 1 and in accordance with EN 14825.

6.2.1.2 Average climate –medium temperature application

If the manufacturer declares the heat pump space heater to operate at both low-temperature and medium temperature application, then additional tests shall be performed on a random basis for the medium temperature application.

The tests shall include:

- 1) Performance tests according to Table 2 to determine the water flow rate where applicable
- 2) Test at $T_{bivalent}$, where applicable
- 3) Randomly selected by the test center: one additional test conditions among A, B, C, D and TOL from Table 1 and different from $T_{bivalent}$, or two test conditions if no $T_{bivalent}$.

6.2.1.3 Warmer climate – same temperature application as for average climate

The manufacturer shall declare performance data, $SCOP_{on}$ and SCOP for warmer climate, and additional tests are performed on a random basis to grant the label for this climate, as follows:

- 1) Randomly selected by the test center: one test conditions among A to F from Table 1

6.2.1.4 Colder climate – same temperature application as for average climate

If the manufacturer declares perform data, $SCOP_{on}$ and SCOP for colder climate, additional tests are performed on a random basis to grant the label for this climate, as follows: Randomly selected by the test centre: One test conditions among $T_{bivalent}$, TOL or G (-15°C)

- 1) Randomly selected by the test centre: One additional test conditions among A to G from **Table 1**

6.2.2 Electric power consumptions

For average climate, the following electric power consumptions shall be measured according to EN 14825:

- electric power consumption during thermostat off mode, P_{TO}
- electric power consumption during standby mode, P_{SB}
- electric power consumption during crankcase heater mode, P_{CK}
- electric power consumption during off mode, P_{OFF}

6.2.3 Determination of the degradation coefficient

If the manufacturer declares a degradation factor different from the default value $C_{dh} = 0,9$ the degradation factor shall be determined according EN 14825.

6.2.4 SCOP calculations

The heat pump being granted on the basis of the SCOP values, the test center shall calculate the $SCOP_{on}$ and SCOP for the average climate and for the warmer/colder climate where appropriate and report it (or them).

Calculations shall be made by using EHPA Excel tool, based on the calculation methodology as described in EN 14825.

6.3 Test methods

Testing shall be made according to EN 14825 and EN 14511-3 with the additional following requirements:

6.3.1 Refrigerant charge

Prefilled units in factory can be delivered as produced, if no additional refrigerant charge is required for testing installation. This is valid only if the factory has a control procedure for the refrigerant charging.

If the heat pump is delivered filled with nitrogen and shall be charged with refrigerant by the test laboratory, then the refrigerant type and charge shall be as specified in the technical data (nameplate or technical documentation) provided by the manufacturer.

6.3.2 Fixed capacity units

For fixed capacity units, the thermostat temperature shall be set at the highest value to force the unit to operate continuously, except in case of cycling tests for the determination of the degradation factor.

6.3.3 Variable and staged capacity units

For variable and staged capacity units, the setting of the controls (stage, frequency of the compressor,) shall be done for each test condition as specified by the manufacturer.

6.4 Sound power level measurement

Measurement of the sound power level of the heat pump shall be performed according to the European standard EN 12102-1, using Class A method, at the reference condition of the highest temperature application for which the unit shall be granted.

According to the type of heat pump, the following sound power levels shall be measured:

1. Package unit, outdoors installation
 - a. L_{Wo} sound power level radiated by the outdoor side casing
2. Package unit, indoors installation
 - a. L_{Wdo} sound power level through the discharge duct, if the heat pump is delivered without duct connections
or
 - b. L_{Wo} sound power level radiated by the duct termination of the heat pump, if the heat pump is delivered with the duct connections
and
 - c. L_{Wi} sound power level radiated by the indoor side casing
3. Split unit
 - a. L_{Wo} sound power level radiated by the outdoor side casing
 - b. L_{Wi} sound power level radiated by the indoor side casing, only if the compressor is part of the indoor unit.

For units having defrost cycles at the reference test condition, the acoustic test is performed with humidity control of the air inlet so that no cycling operation of the unit occurs during the test.

6.5 Testing the operating range and safety tests

Operating tests shall be performed according to EN 14511-4 as follows:

- Starting and operating tests
- shutting off the heat transfer medium flows,
- Complete power supply failure.

7. Test report Level 1 (disclosure status: private)

Production of this test report by the heat pump test centre is part of the overall test procedure. The report is sent only to the manufacturer or the customer who has ordered the tests.

The heat pump test centre is allowed to publish the test results only if the applicant has approved such publication with an authorized signature.

This test report level 1 shall contain all test documents and shall fulfil the requirements in EN 14511-3 and EN 12102-1.

7.1 General information on the testing institute

- Date
- Name of the testing institute
- Test location
- Test supervisor
- Test number
- References for properties of fluids
- Test methods and reference to EN standards
- References to the EHPA regulation and version

7.2 Technical datasheet

- Name of the customer (usually the manufacturer)
- Machine type, designation
- Serial number (if not available, compressor serial number)
- Brief description of the design (including if the outdoor side is ducted or not)
- Information on the components, such as compressor type, heat exchanger type, expansion valve type, etc.
- Year of production
- Photos of the machine and the marking plate
- Dimensions and weight of the heat pump
- Type and charge of refrigerant:
- GWP₁₀₀ value of the refrigerant

7.3 Performance tests

The report shall include a description of the heat pump tested including all settings, such as thermostat, fan and pump speeds and capacity control settings where applicable.

7.4 Sound power level measurement

- Specific requirements for installation of the tested model(s), where applicable
- acoustic test method
- measured sound power level(s)
- It shall include all data recorded as specified in EN 12102-1 and the standard of the used method, where applicable

7.5 Operating range and safety tests

- Operating range tests passed or failed
- Safety tests passed or failed

8. Marking

Each heat pump shall have a durable, permanently fixed marking that is easily readable when the unit is in position for use, bearing at least the information required by the safety standards

The nameplate shall include the following information:

- Manufacturer or supplier
- Model designation and serial number
- Type and filling weight of the refrigerant

As heating capacities are dependant of the test conditions and of the different possible matching of the two parts of a split unit, these performances shall be indicated in the technical documentation of the manufacturer.

EHPA Testing Regulation

Testing of Air/Water Heat Pumps

Terms, Test Conditions and Test Method based on EN 14825, EN 14511-1 to 4 and EN 12102-1

Additional requirements for granting the international quality label for heat pumps



Version 2.4a
Release 7.06.2021

Revisions of the document

| Version | Date | Main changes | Clause | Page | Author |
|---------|--------------|---|--------|---------|--------------|
| 2.2 | July 2015 | Initial version | | - | M. Mondot |
| 2.3 | April 2016 | Table of modifications | - | page 2 | M. Mondot |
| | | Suppression of the transitional period | | page 4 | |
| | | Dates of the applicable standards | 3 | page 4 | |
| | | Clarification of the determination of water flow rates | 6.1 | page 6 | |
| 2.4 | October 2020 | Combination of 6.6 Testing the operating range and 6.7 Safety tests | 6.6 | page 8 | C. Koefinger |
| | | Removal of 6.7 Safety tests | 6.7 | page 10 | C. Koefinger |
| | | Removal of A2/W35 | | page 4 | C. Koefinger |
| | | Clarification on temperature applications | 6.2.1 | page 6 | C. Koefinger |
| | | Shift of 6.4 to the main QL document | 6.4 | page 8 | C. Koefinger |

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1 Introduction

This regulation specifies the terms and definitions, the test conditions, the performance tests and other requirements for granting the EHPA Quality Label to air-to-water heat pumps for space heating.

The test conditions and testing methods and requirements described in this regulation are based on the European standards EN 12102, EN 14825 and EN 14511 - Parts 1 to 4 and on additional specifications referenced herein. Anything not defined in this test regulation shall be considered regarding EN 14825, EN 14511 and EN 12102-1.

A heat pump can be awarded with the International Heat Pump Quality Label once it is successfully tested in accordance with this regulation. The process is described in the “EHPA regulations for granting the international quality label for electrically driven heat pumps”.

This regulation has been adopted by the EHPA Quality Label Committee. Any changes to them must be approved by the Committee.

2 Scope of the regulation

This regulation applies to the testing of factory-made electrically driven air-to-water heat pumps for space heating.

In order to qualify for the EHPA Quality Label, the heat pump submitted for testing must be from series production.

3 Reference documents

The latest edition of the reference standards (including any amendments) applies.

EN 14825

Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance

EN 14511

Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling

Part 1: Terms and definitions

Part 2: Test conditions

Part 3: Test method

Part 4: Requirements

EN 12102

Air conditioners, heat pumps and dehumidifiers with electrically driven compressors – Measurement of airborne noise – Determination of the sound power level

4 Terms and definitions

The terms and definitions given in EN 14825, EN 14511-1 and EN 12102-1 apply.

5 Performance data to be declared by the manufacturer

When applying for the EHPA Quality label for air-to-water heat pumps, the manufacturer shall provide the performance data for all climates which are declared for the Energy Labelling, i.e.:

- Average, colder and warmer,
- or
- Average and warmer.

The performance data to be declared on the application form are as follows:

1. Temperature application: low-temperature and/or medium temperature
2. Fixed water flow / variable water flow
3. Fixed outlet temperature / variable outlet temperature
4. Electric power consumptions in other modes than active mode: P_{OFF} , P_{SB} , P_{TO} and P_{CK}
5. Per Climate
 - a. $P_{designh}$ at $T_{designh}$
 - b. Bivalent temperature, $T_{bivalent}$, where applicable
 - c. Type of back up heater electric or fossil fuel, where applicable
 - d. Operating limit temperature, TOL
 - e. Performance data for test conditions A to G according to Table 1
 - f. $SCOP_{on}$ and SCOP

Table 1 – Performance data for each climate / temperature application to be declared by the manufacturer

| Test condition | Outdoor temperature °C | Outlet water temperature °C | Declared capacity DC (kW) | Declared COP COP_d | Degradation factor C_{dh}^1 |
|----------------|--------------------------|-----------------------------|---------------------------|----------------------|-------------------------------|
| A | -7(-8) | | | | |
| B | 2(1) | | | | |
| C | 7(6) | | | | |
| D | 12(11) | | | | |
| E ² | TOL | | | | |
| F ³ | ¹ bivalent | | | | |
| G ⁴ | -15 | | | | |

¹ where applicable, because of On/Off capacity cycling

² in case $TOL < T_{designh}$ the performance data shall be declared at $TOL = T_{designh}$

³ where applicable

⁴ Only for colder climate and if $TOL < -20^\circ C$

6 Tests to be performed

To be granted the heat pump shall perform the following tests:

- a) Performance tests (see chapter 6.1)
- b) Seasonal performance tests and SCOP calculations (see chapter 6.2),
- b) Acoustic test (see chapter 6.5)
- c) Testing operating range and safety tests (see chapter 6.6)

6.1 Performance tests

Performance tests shall be made in accordance with EN 14511 for the determination of the heating capacity and COP at the test conditions given in Table 2.

Table 2 – Test conditions for performance tests

| Temperature application | N° | Test condition | Heat source | | Heat sink | |
|-------------------------|----|----------------|---------------------------------|---------------------------------|------------------------|-------------------------|
| | | | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | Outlet temperature (°C) |
| Low temperature | 1 | A7/W35 | 7 | 6 | 30 | 35 |
| Medium temperature | 2 | A7/W55 | 7 | 6 | 47 | 55 |

Performance test n°1 is required for units with fixed flow rate to determine the water flow rate to be used for seasonal performance tests at low temperature application.

Performance test n°2 is required for units with fixed flow rate to determine the water flow rate for seasonal performance tests at medium temperature application, where applicable.

6.2 Seasonal performance tests and SCOP calculation

6.2.1 Declared capacity and COP

6.2.1.1 Average climate –low temperature application

The seasonal performance tests shall be performed in all the A to G conditions, where applicable, as specified in Table 1 and in accordance with EN 14825.

6.2.1.2 Average climate –medium temperature application

If the manufacturer declares the heat pump space heater to operate at both low-temperature and medium temperature application, then additional tests shall be performed on a random basis for the second temperature application.

The tests shall include:

- 1) Performance tests according to Table 2 to determine the water flow rate where applicable
- 2) Test at $T_{bivalent}$, where applicable
- 3) Randomly selected by the test center: one additional test conditions among A, B, C, D and TOL from Table 1 and different from $T_{bivalent}$, or two test conditions if no $T_{bivalent}$.

6.2.1.3 Warmer climate – same temperature application as for average climate

The manufacturer shall declare performance data, $SCOP_{on}$ and SCOP for warmer climate, and additional tests are performed on a random basis to grant the label for this climate, as follows:

- 1) Randomly selected by the test center: one test conditions among A to F from Table 1

6.2.1.4 Colder climate – same temperature application as for average climate

If the manufacturer declares perform data, $SCOP_{on}$ and SCOP for colder climate, additional tests are performed on a random basis to grant the label for this climate, as follows:

- 1) Randomly selected by the test centre: One test conditions among $T_{bivalent}$, TOL or G (-15°C)
- 2) Randomly selected by the test centre: One additional test conditions among A to G from Table 1

If the measured capacity at $T_{bivalent}$ is not fulfilling the tolerances given in 6.4.2, then it is considered that the declared data $P_{designh}$ and $T_{bivalent}$ are not consistent and the tests are stopped.

6.2.2 Electric power consumptions

For average climate, the following electric power consumptions shall be measured according to EN 14825:

- electric power consumption during thermostat off mode, P_{TO}
- electric power consumption during standby mode, P_{SB}
- electric power consumption during crankcase heater mode, P_{CK}
- electric power consumption during off mode, P_{OFF}

6.2.3 Determination of the degradation coefficient

If the manufacturer declares a degradation factor different from the default value $C_{dh} = 0,9$ the degradation factor shall be determined according EN 14825.

6.2.4 SCOP calculations

The heat pump being granted on the basis of the SCOP values, the test center shall calculate the $SCOP_{on}$ and SCOP for the average climate and for the warmer/colder climate where appropriate and report it (or them).

Calculations shall be made by using EHPA Excel tool, based on the calculation methodology as described in EN 14825.

6.3 Test methods

Testing shall be made according to EN 14825 and EN 14511-3 with the additional following requirements:

6.3.1 Refrigerant charge

Prefilled units in factory can be delivered as produced, if no additional refrigerant charge is required for testing installation. This is valid only if the factory has a control procedure for the refrigerant charging.

If the heat pump is delivered filled with nitrogen and shall be charged with refrigerant by the test laboratory, then the refrigerant type and charge shall be as specified in the technical data (nameplate or technical documentation) provided by the manufacturer.

6.3.2 Fixed capacity units

For fixed capacity units, the thermostat temperature shall be set at the highest value to force the unit to operate continuously, except in case of cycling tests for the determination of the degradation factor.

6.3.3 Variable and staged capacity units

For variable and staged capacity units, the setting of the controls (stage, frequency of the compressor,) shall be done for each test condition as specified by the manufacturer.

6.4 Tolerances on performance data

6.4.1 Performance data

The declared performance data, as specified in Table 2, shall be considered valid if the values are not deviating by more than +5% from the measured capacity and COP values.

In case of larger deviations, the measurements for SCOP calculation are not performed.

6.4.2 Seasonal performance data

For the conditions A to F from Table 1 to be tested, the declared capacities and COP shall not differ by more than +8% from the measured values.

6.5 Sound power level measurement

Measurement of the sound power level of the heat pump shall be performed according to the European standard EN 12102-1, using Class A method, at the reference condition of the highest temperature application for which the unit shall be granted.

According to the type of heat pump, the following sound power levels shall be measured:

1. Package unit, outdoors installation
 - a. L_{Wo} sound power level radiated by the outdoor side casing
2. Package unit, indoors installation
 - a. L_{Wdo} sound power level through the discharge duct, if the heat pump is delivered without duct connections
 - or
 - b. L_{Wo} sound power level radiated by the duct termination of the heat pump, if the heat pump is delivered with the duct connections
 - and
 - c. $L_{Wisound}$ power level radiated by the indoor side casing
3. Split unit
 - a. L_{Wo} sound power level radiated by the outdoor side casing
 - b. L_{Wi} sound power level radiated by the indoor side casing, only if the compressor is part of the indoor unit.

For units having defrost cycles at the reference test condition, the acoustic test is performed with humidity control of the air inlet so that no cycling operation of the unit occurs during the test.

6.6 Testing the operating range and safety tests

Operating tests shall be performed according to EN 14511-4 as follows:

- Starting and operating tests
- shutting off the heat transfer medium flows,
- Complete power supply failure.

7 Test report Level 1 (disclosure status: private)

Production of this test report by the heat pump test centre is part of the overall test procedure. The report is sent only to the manufacturer or the customer who has ordered the tests.

The heat pump test centre is allowed to publish the test results only if the applicant has approved such publication with an authorized signature.

This test report level 1 shall contain all test documents and shall fulfil the requirements in EN 14511-3 and EN 12102-1.

7.1 General information on the testing institute

- Date
- Name of the testing institute
- Test location
- Test supervisor
- Test number
- References for properties of fluids
- Test methods and reference to EN standards
- References to the EHPA regulation and version

7.2 Technical datasheet

- Name of the customer (usually the manufacturer)
- Machine type, designation
- Serial number (if not available, compressor serial number)

- Brief description of the design (including if the outdoor side is ducted or not)
- Information on the components, such as compressor type, heat exchanger type, expansion valve type, etc.
- Year of production
- Photos of the machine and the marking plate
- Dimensions and weight of the heat pump
- Type and charge of refrigerant:
- GWP₁₀₀ value of the refrigerant

7.3 Performance tests

The report shall include a description of the heat pump tested including all settings, such as thermostat, fan and pump speeds and capacity control settings where applicable.

7.4 Sound power level measurement

- Specific requirements for installation of the tested model(s), where applicable
- acoustic test method
- measured sound power level(s)
- It shall include all data recorded as specified in EN 12102-1 and the standard of the used method, where applicable

7.5 Operating range and safety tests

- Operating range tests passed or failed
- Safety tests passed or failed

8 Marking

Each heat pump shall have a durable, permanently fixed marking that is easily readable when the unit is in position for use, bearing at least the information required by the safety standards

The nameplate shall include the following information:

- Manufacturer or supplier
- Model designation and serial number
- Type and filling weight of the refrigerant

As heating capacities are dependant of the test conditions and of the different possible matching of the two parts of a split unit, these performances shall be indicated in the technical documentation of the manufacturer.

**Test results of the air to water heat pump Haier AU162FYCRA(HW)
SN: AA2JT 3E290 0AUNA H0130.**

Publication of the test results

By signing this legally binding contract, the Heat Pump Test Center is obliged to treat all information about test results and design of the test unit as confidential. The address of the costumer and the designation of the test unit are excluded from this contract.

The test report 1 (1 page) and the test report 2 (2 pages) can be published in accordance with the supplement of the WPZ with written approval of the customer. We would like to ask you to provide a legally binding signature on this form in order to publish these results.

At the same time we would like to inform you that all test reports of the WPZ are protected by a copyright ©, which prohibits forwarding them to third parties.


Indication of modifications to the product and distribution using a different product denomination

All test results are exclusively valid for heat pumps of the same type as tested at the Heat Pump Test Center WPZ. Make and model of the heat pump have to be entirely the same as the one tested in Buchs. All modifications in construction and components of the heat pump have to be indicated immediately to the WPZ.

With your legally binding signature you also confirm, that dimensioning, material selection and fabrication of the tested heat pump is consistent with the heat pump units available for sale.

Signatures:

Buchs, 30.01.2025
.....
Place and date



.....
Mick Eschmann
Head of Heat Pump Test Center WPZ

.....
Place and date

.....
Damian Trzaska
Iglotech Sp. Z o.o.

Iglotech Sp. z o.o.
Damian Trzaska
ul. Torunska 41
82-500 Kwidzyn
Poland

Tuesday, 28.01.2025

**Test report of your air to water heat pump Haier AU162FYCRA(HW)
SN: AA2JT 3E290 0AUNA H0130. Publication of the test results on request.**

Dear Mr Trzaska,

enclosed you will find among other things the test report of your air to water heat pump Haier AU162FYCRA(HW) SN: AA2JT 3E290 0AUNA H0130. The test of this air to water heat pump has the intern order number LW-696-25-02.

**Publication of test results of your air to water heat pump Haier AU162FYCRA(HW)
SN: AA2JT 3E290 0AUNA H0130 on request.**

By signing the enclosed legally binding contract, the Heat Pump Test Center WPZ is obliged to treat all information about test results and design of the test unit as confidential. The address of the customer and the designation of the test unit are excluded from this contract.

The test report 1 (1 page) and the test report 2 (2 pages) can be published in accordance with the supplement of the WPZ with written approval of the customer.:

Test report 1 This report contains a selected record of data what would be published by WPZ Bulletin and by our web page. This data are displayed in a table. This table also included others manufacturers or distributors.

Test report 2 This report contains additional measured data. This test report is compiled for people who are interested in technology. The WPZ would provide this information for a fee (two A4-pages).

Test report 3 this full report included the documentation of all measurements and analyses of the corresponding air to water heat pump. This full report is intended for customer only and will not be published.

We would like to ask you to provide a legally binding signature on the enclosed report 1 and report 2 to publish these results.

At the same time, we would like to inform you that all test reports of the WPZ are protected by a copyright ©, which prohibits forwarding them to third parties.

Best regards,



Mick Eschmann
Head of Heat Pump Test Center WPZ and Acoustic
Eastern Switzerland University of Applied Sciences OST

Supplement:

- Full test report LW-696-25-02 (test report 3)
- Test report 1 and test report 2 including covering page (double) for legally binding signature and return consignment.

| Auftraggeber Customer | Gerät Type | Prüfnummer Test number | Bauart Type of construction | Kältemittel Refrigerant | Kältemittelmenge [kg] Capacity of refrigerant | Prüfbedingungen Test conditions | | low (35°C) - average | | | | | | | | Bivalentpunkt [°C] Bivalent point | Volumenstrom [m³/h] Volume flow | SCOP | Schalleistungspegel aussen [dB(A)] Sound power level outdoor | Schalleistungspegel innen [dB(A)] Sound power leve indoor |
|---|----------------------|---------------------------|--------------------------------|----------------------------|--|------------------------------------|------------------------------------|----------------------|------------|-----------|----------|----------|-----------|-------|----|--------------------------------------|------------------------------------|------|---|--|
| | | | | | | Heizleistung / Heat. cap. [kW] | El. Leistung / Input power [kW] | A7W30-35 | A-10Wxx-35 | A-7Wxx-34 | A2Wxx-30 | A7Wxx-27 | A12Wxx-24 | Tbiv | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| Refsystem Sp. z o.o. ul. Metalowców 5 PL - 86-300 Grudziądz | Haier AU162FYCRA(HW) | LW-696-25-02 | b, d | R32 | 2.6 | Heizleistung / Heat. cap. [kW] | 16.01 | - | 13.96 | 13.69 | 8.22 | 5.64 | 5.81 | 13.69 | -7 | 3 | 4.2 | 62 | - | |
| | | | | | | El. Leistung / Input power [kW] | 3.98 | - | 5.89 | 5.11 | 2.18 | 0.94 | 0.70 | 5.11 | | | | | | |
| | | | | | | COP | 4.0 | - | 2.4 | 2.7 | 3.8 | 6.0 | 8.3 | 2.7 | | | | | | |

| Auftraggeber Customer | Gerät Type | Prüfnummer Test number | Bauart Type of construction | Kältemittel Refrigerant | Kältemittelmenge [kg] Capacity of refrigerant | Prüfbedingungen Test conditions | | | | | | | | | | Bivalentpunkt [°C] Bivalent point | Volumenstrom [m³/h] Volume flow | SCOP | Schalleistungspegel aussen [dB(A)] Sound power level outdoor | Schalleistungspegel innen [dB(A)] Sound power level indoor |
|---|----------------------|---------------------------|--------------------------------|----------------------------|--|--|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------|------|---|--------------------------------------|------------------------------------|------|---|---|
| | | | | | | medium (55°C) - average | | | | | | | | | | | | | | |
| | | | | | | A7W47-55 | | | A-10Wxx-55 | A-7Wxx-52 | A2Wxx-42 | A7Wxx-36 | A12Wxx-30 | Tbiv | | | | | | |
| Refsystem Sp. z o.o. ul. Metalowców 5 PL - 86-300 Grudziądz | Haier AU162FYCRA(HW) | LW-696-25-02 | b, d | R32 | 2.6 | Heizleistung / Heat. cap. [kW] El. Leistung / Input power [kW] COP [-] | 13.70 5.26 2.6 | 7.19 1.1 | 6.56 1.8 | 2.27 3.2 | 1.15 4.4 | 0.88 6.2 | 12.08 6.56 1.8 | -7 | 1 | 3.2 | 62 | - | | |

| Bauart / Type of construction | | Prüfbedingungen / Test conditions | |
|-------------------------------|---|-----------------------------------|--|
| a | Kompaktwärmepumpe für Innenaufstellung Compact heat pump for indoor installation | A | Lufteintrittstemperatur air inlet temperature |
| b | Kompaktwärmepumpe für Aussenaufstellung Compact heat pump for outdoor installation | B | Soleeintrittstemperatur brine inlet temperature |
| c | Splitwärmepumpe Split heat pump | W | Wassereintrittstemperatur water inlet temperature |
| d | Leistungsgeregelte Wärmepumpe mit Frequenzumformer Output-regulated heat pump with frequency converter | W | Vorlauftemperatur water outlet temperature |
| e | Leistungsgeregelte Wärmepumpe mit 2 Verdichtern Output-regulated heat pump with 2 compressors | COP | Leistungszahl Coefficient of performance |



Prüfnummer LW-696-25-02
Test No.

Veröffentlichung 2 (Luft/Wasser-Wärmepumpe)

2

Publishment 2 (air to water heat pump)

| | | | |
|--|--|---|--|
| Auftraggeber Customer | Refsystem Sp. z o.o. ul. Metalowców 5 PL - 86-300 Grudziądz | Datum der Prüfung Date of test | 13.01.2025 - 27.01.2025 |
| Gerät Type | Haier Haier AU162FYCRA(HW) SN: AA2JT 3E290 0AUNA H0130 | Bauart Type of construction | Wärmepumpe für Aussenaufstellung heat pump for outdoor installation |
| Kältemittel Refrigerant | R32 GWP(100) = 675 | Kältemittelfüllmenge Capacity of refrigerant | 2.6 kg |
| Abtauart Mode of defrosting | Prozessumkehr reversal of process | | |
| Senkenvolumenstrom V_{35} sink water flow rate V_{35} | 2.770 m ³ h ⁻¹ | Luftvolumenstrom air flow rate | |
| Senkenvolumenstrom V_{55} sink water flow rate V_{55} | 1.479 m ³ h ⁻¹ | Gebläsedrehzahl fan speed | |
| Prüfung wurde gemäss den folgenden Normen durchgeführt Mesures exécutées conformément aux normes Measurements according to the following standards | EN 14511:2022 and EN 14825:2022 EN 12102-1:2022 and EN ISO 9614-1:2010 - | | |

Leistungen / Performances / Performances

LW-696-25-02

| | Prüfbedingung Condition d'essai Test condition | Heizleistung Puis. chauff. moy. Heating capacity kW | elek. Leistung Puis. elec. moy. Input power kW | COP | Cdh | CR | T _{VL} T _{OUT} T _{OUT} °C |
|---|--|--|---|------|-------|------|---|
| 1 | A7W30-35 | 16.007 | 3.983 | 4.02 | - | - | - |
| 2 | - | - | - | - | - | - | - |
| 3 | - | - | - | - | - | - | - |
| 4 | - | - | - | - | - | - | - |
| A | A-7Wxx-34 | 13.690 | 5.111 | 2.68 | - | 1.00 | 34.0 |
| B | A2Wxx-30 | 8.216 | 2.176 | 3.78 | - | 1.00 | 30.0 |
| C | A7Wxx-27 | 5.640 | 0.940 | 6.00 | - | 1.00 | 27.0 |
| D | A12Wxx-24 | 5.813 | 0.702 | 8.28 | 0.982 | 0.42 | 25.1 |
| E | A-10Wxx-35 | 13.958 | 5.893 | 2.37 | - | 1.00 | 35.0 |
| F | A-7Wxx-34 | 13.690 | 5.111 | 2.68 | - | 1.00 | 34.0 |

| climate | average |
|-------------------------|----------------------|
| Temperature application | low (35 °C) |
| SCOP _{on} | 4.19 |
| Labeling | A++ / 164.7 % |
| Pdesignh [kW] | 15.5 |
| Q _H [kWh] | 33056.0 |
| Tbivalent [°C] | -7 |

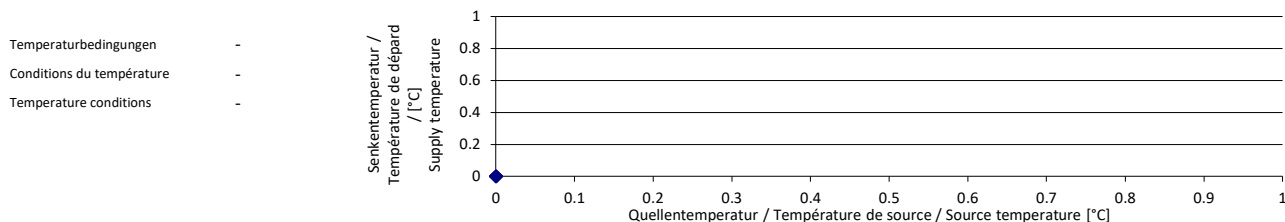
| | Prüfbedingung Condition d'essai Test condition | Heizleistung Puis. chauff. moy. Heating capacity kW | elek. Leistung Puis. elec. moy. Input power kW | COP | Cdh | CR | T _{VL} T _{OUT} T _{OUT} °C |
|-----|--|--|---|------|-------|------|---|
| 1 | A7W47-55 | 13.697 | 5.255 | 2.61 | - | - | - |
| A | A-7 / Wxx-52 (73% r.H.) | 12.083 | 6.560 | 1.84 | - | 1.00 | 52.0 |
| B | A2 / Wxx-42 (84% r.H.) | 7.316 | 2.273 | 3.22 | - | 1.00 | 42.0 |
| C | A7 / Wxx-36 (87% r.H.) | 5.103 | 1.149 | 4.44 | - | 1.00 | 36.0 |
| D | A12 / Wxx-30 (89% r.H.) | 5.457 | 0.877 | 6.23 | 0.987 | 0.39 | 31.9 |
| E | A-10 / Wxx-55 (68% r.H.) | 7.925 | 7.189 | 1.10 | - | 1.00 | 55.0 |
| F | A-7 / Wxx-52 (73% r.H.) | 12.083 | 6.560 | 1.84 | - | 1.00 | 52.0 |
| 1 | A7W47-55 | 13.697 | 5.255 | 2.61 | - | - | - |
| 2 | - | - | - | - | - | - | - |
| 3 | - | - | - | - | - | - | - |
| 4 | - | - | - | - | - | - | - |
| Pto | W 12.5 | Psb | W 17.2 | Pck | W | Poff | W 17.2 |

| climate | average |
|-------------------------|----------------------|
| Temperature application | Reversible |
| SCOP _{on} | 3.25 |
| Labeling | A++ / 126.9 % |
| Pdesignh [kW] | 13.7 |
| Q _H [kWh] | 28924.0 |
| Tbivalent [°C] | -7 |

| | Prüfbedingung Condition d'essai Test condition | Kühlleistung Puis. refroid. moy. Cooling capacity kW | elek. Leistung Puis. elec. moy. Input power kW | EER |
|---|--|---|---|------|
| 1 | A35 / W23-18 | 16.18 | 3.74 | 4.33 |
| 2 | A35 / W12-7 | 14.57 | 5.20 | 2.80 |

| | | |
|--------------------------|-----------------------|--|
| Sicherheitsprüfung nach | EN 14511-4 clause 4.5 | nicht durchgeführt / n'est pas effectuée / not applied |
| Test de sécurité aux | EN 14511-4 clause 4.6 | nicht durchgeführt / n'est pas effectuée / not applied |
| Safety test according to | | |

Einsatzgrenzen / Limites d'utilisation / Operating range



Schallleistungspegel bei / Niveau de puissance acoustique au / Sound power level at A7/W47-55

| | | |
|---------------------|-------|------|
| Aussenmessung | | |
| Mesure extérieure | dB(A) | 61.9 |
| Outdoor measurement | | |

Hinweis / Remarque / Notice