



Calibration certificate

Certificate number: LH00789

Revision 2.0

Applicant

: CCSTEC GesmbH
Triesterstrasse 36
A-2512, Oeynhausen
Austria

Instrument

: Description : Airborne particle counter
: Manufacturer : Lighthouse
: Model : Solair 3100
: Serial no. : 130404002
: Customer ID : C77

Date of calibration

: 03 February 2016

Due date calibration

: February 2017

Calibration location

: Lighthouse Benelux Calibration laboratory
in Boven-Leeuwen

Calibration method

: Calibration has been accomplished as described in ISO21501-4:2007.
All work performed is in accordance with Lighthouse Worldwide
Solutions Benelux, Master Calibration Document: I201 and is recorded
and maintained as such.

Results

: The results of the measurements are shown in the appendix.
The unit is readjusted.
The unit under test meets its specifications at all the points measured.

Traceability

: The measurements have been executed using standards for which the
traceability to (inter)national standards has been demonstrated.

A.A.J. van den Heuvel
Quality & Customer service Coordinator



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Appendix

Certificate number: LH00789

Date of calibration : 03 February 2016

Calibrated by : E.A.H. van Mook

Function : Calibration & Service Engineer

Environmental conditions : The ambient temperature was 22.6°C at a relative humidity of 35%

Measurement results, As found

| Performance information | | | |
|-------------------------------------|---|--------------|-------------|
| Test | Test result | Criteria | Pass / Fail |
| ISO21501-4 Flow | 28.50l/min | ±5% | Pass |
| JIS B 9921 Zero count | 0 | <1 in 5 mins | Pass |
| ISO21501-4 False count rate | Upper confidence level 21 particles/m3 | N/A | N/A |
| ISO21501-4 Timer check | 60.0 seconds | ±1% | Pass |
| ISO21501-4 Size resolution | 0.84% | < 15% | Pass |
| ISO21501-4 Counting efficiency 50% | 41.92% | (50±20)% | Pass |
| ISO21501-4 Counting efficiency 100% | 112.80% | (100±10)% | Fail |

| Size calibration | | | | |
|------------------|--------------|-------------------|-----------------|--------------------------------|
| Channel | Channel Size | Threshold voltage | Calculated size | Calculated Sizing error (±10%) |
| 1 | 0.3µm | 56mV | 0.296µm | -1.33% |
| 2 | 0.5µm | 634mV | 0.508µm | 1.54% |
| 3 | 0.7µm | 1383mV | 0.718µm | 2.52% |
| 4 | 1.0µm | 1700mV | 1.010µm | 0.97% |
| 5 | 2.0µm | 2828mV | 1.981µm | -0.95% |
| 6 | 3.0µm | 3498mV | 3.115µm | 3.82% |
| 7 | 5.0µm | 3789mV | 4.814µm | -3.72% |
| 8 | 10.0µm | 4633mV | 10.961µm | 9.61% |

Notes

| Reference equipment | | | |
|---------------------------|-------------|-------------|--------------------|
| Model | S/N | Due to | Certificate number |
| TSI Mass Flowmeter 4043 | 40431138006 | 30-Sep-2016 | 31892 |
| MCA8000A | 3387 | 21-Oct-2016 | 1510-08307 |
| Fluke-175 | 12170243 | 4-Jun-2016 | 1481270 |
| Fisher Scientific 0666256 | 150783954 | 20-Oct-2017 | 1042-7138748 |
| Solair 2010+ | 100461001 | 24-May-2016 | 1511616 |

| Particle size standards | | | |
|-------------------------|---|------------|-------|
| Size | Description | Due to | Lot# |
| 0.3µm | 3300A & 3300B, Nanosphere Size Standards | 1-Sep-2017 | 42979 |
| 0.5µm | 3500 & 3500A, Nanosphere Size Standards | 1-Aug-2018 | 43313 |
| 0.7µm | 3700 & 3700A, Nanosphere Size Standards | 1-Jun-2018 | 43252 |
| 1.0µm | 4009A, 4009A & 4009B Microsphere Size Standards | 1-Mar-2018 | 43160 |
| 2.0µm | 4202 & 4202A, Particle Size Standards | 1-Aug-2018 | 43313 |
| 3.0µm | 4203 and 4203A, Particle Size Standards | 1-Jun-2018 | 43252 |
| 5.0µm | 4205, 4205A and 4205C Microsphere Size St. | 1-Jun-2018 | 43252 |
| 10.0µm | 4210 and 4210A Microsphere Size Standards | 1-May-2018 | 43221 |



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Measurement results, As left

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| JIS B 9921 Zero count | 0 | <1 in 5 mins | Pass |
| ISO21501-4 False count rate | Upper confidence level 21 particles/m3 | N/A | N/A |
| ISO21501-4 Timer check | 60.0 seconds | ±1% | Pass |
| ISO21501-4 Size resolution | 0.47% | < 15% | Pass |
| ISO21501-4 Counting efficiency 50% | 43.62% | (50±20)% | Pass |
| ISO21501-4 Counting efficiency 100% | 101.50% | (100±10)% | Pass |

| Size calibration | | | | |
|------------------|--------------|-------------------|-----------------|--------------------------------|
| Channel | Channel Size | Threshold voltage | Calculated size | Calculated Sizing error (±10%) |
| 1 | 0.3µm | 55mV | 0.296µm | -1.33% |
| 2 | 0.5µm | 635mV | 0.508µm | 1.60% |
| 3 | 0.7µm | 1365mV | 0.707µm | 1.00% |
| 4 | 1.0µm | 1682mV | 0.994µm | -0.60% |
| 5 | 2.0µm | 2849mV | 2.020µm | 1.00% |
| 6 | 3.0µm | 3459mV | 2.995µm | -0.17% |
| 7 | 5.0µm | 3821mV | 5.021µm | 0.42% |
| 8 | 10.0µm | 4535mV | 10.120µm | 1.20% |

Notes

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|---------------------------|-------------|-------------|--------------------|
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| 10.0µm | 4210 and 4210A Microsphere Size Standards | 1-May-2018 | 43221 |