

Applicant

CCSTEC
Triester Straße 36
2512 Oeynhausen
Österreich

Instrument

Type:	Airborne Particle Counter
Manufacturer:	Lighthouse Worldwide Solutions
Model:	Solair 3100
Serial no.:	200404033
Customer device ID.:	C103

Date of receipt 12. May 2022

Calibration date 12. May 2022

Due date of calibration May 2023

Calibration Location A-2512 Oeynhausen

Calibration methode Calibration has been accomplished as described according to ISO 21501-4:2018.

Results

The unit is calibratable.
All measured values comply with the specification limit(s).
The unit is readjusted.
The following results refer only to the particle counter listed above
The result of the measurements are shown on the following pages.

Traceability Reference equipment used for calibration are regularly calibrated and traceable to national standards.

Uncertainty

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of $k = 2$, which provides a confidence level of approximately 95%. The standard uncertainty is determined in accordance with EA-4/02.

Calibrated by:

Christian Ribarits
12. May 2022
(Name, Date, Signature)

Approved by:

Marcus Willig
13. May 2022
(Name, Date, Signature)

Date of calibration 12. May 2022

Calibrated by Christian Ribarits

Environmental conditions 22,9 °C to 23,6 °C 49,4 %rF to 53,5 %rF

Results, As found**Performance details**

Test	Test result	Expanded uncertainty	Criteria	Pass / Fail
ISO21501-4 Sampling Flow rate error	0,05 % $\pm$ 0,02 l/min	0,20 l/min	28,3 l/min. $\pm$ 5%	Pass
JIS B 9921 Zero count	0 particles in 5 min. Upper confidence level	n.a.	< 1 in 5 min.	Pass
ISO21501-4 False count rate	21,19 particles/m ³	n.a.	n.a.	Pass
ISO21501-4 Sampling time error	-0,32 % $\pm$ -0,190 sec.	0,041 sec.	< 1%	Pass
ISO21501-4 Size resolution	4,72 % used size 0,401 μ m	0,76 %	< 15%	Pass
ISO21501-4 Counting efficiency 50%	37,20 % used size 0,303 μ m	3,48 %	(50 $\pm$ 20)%	Pass
ISO21501-4 Counting efficiency 100%	94,09 % used size 0,510 μ m	3,48 %	(100 $\pm$ 10)%	Pass

Size calibration

Channel	Channel Size	Threshold voltage	Calculated Size	Expanded uncertainty	Calculated Sizing error ($\pm$ 10%)	Pass / Fail
1.	0,30 μ m	54 mV	0,298 μ m	0,0100 μ m	-0,53 %	Pass
2.	0,50 μ m	502 mV	0,507 μ m	0,0069 μ m	1,31 %	Pass
3.	1,00 μ m	1223 mV	0,999 μ m	0,0076 μ m	-0,13 %	Pass
4.	3,00 μ m	3221 mV	2,917 μ m	0,0067 μ m	-2,77 %	Pass
5.	5,00 μ m	3769 mV	4,763 μ m	0,0041 μ m	-4,75 %	Pass
6.	10,00 μ m	4552 mV	9,062 μ m	0,0081 μ m	-9,38 %	Pass

Notes**Reference Equipment**

Internal ID	Model	Serial Number	Certificate Number	Due date
C63	Definer 220-H	115673	77853	05.04.2023
C118	Jumbo-Digit Stopwatch	221211462	1051-13063162	02.02.2023
C93	MCA 8000D	01665	2111-19947	15.12.2022
C100	Testo 622	3952 1980/909	AF0427 / AD0435	22.12.2022
C109	Solair 3100 GenE	200704044	LH80269	08.12.2022

Reference Particle Standards

Size	Description	Due date	Lot#
0,30 μ m	3300A & 3300B, Nanosphere™ Size Standards	Jan-25	248877
0,40 μ m	3400A, Nanosphere™ Size Standards	Aug-23	230332
0,50 μ m	3500 & 3500A, Nanosphere™ Size Standards	Feb-25	250693
1,00 μ m	4009, 4009A & 4009B, DUKE STANDARDS™ Microsphere Size Standards	Dec-24	247589
3,00 μ m	4D-03, DUKE STANDARDS™ Dry Microsphere Size Standards	Aug-24	244037
5,00 μ m	4D-05, DUKE STANDARDS™ Dry Microsphere Size Standards	Apr-24	239589
10,00 μ m	4D-10, DUKE STANDARDS™ Dry Microsphere Size Standards	Feb-23	221642

Date of calibration 12. May 2022

Calibrated by Christian Ribarits

Environmental conditions 22,8 °C to 23,1 °C 51,3 %rF to 52,8 %rF

Results, As left**Performance details**

Test	Test result	Expanded uncertainty	Criteria	Pass / Fail
ISO21501-4 Sampling Flow rate error	-0,18 % $\pm$ -0,05 l/min	0,20 l/min	28,3 l/min. $\pm$ 5%	Pass
JIS B 9921 Zero count	0 particles in 5 min. Upper confidence level	n.a.	< 1 in 5 min.	Pass
ISO21501-4 False count rate	21,19 particles/m ³	n.a.	n.a.	Pass
ISO21501-4 Sampling time error	-0,22 % $\pm$ -0,130 sec.	0,041 sec.	< 1%	Pass
ISO21501-4 Size resolution	4,72 % used size 0,401 μ m	0,76 %	< 15%	Pass
ISO21501-4 Counting efficiency 50%	42,23 % used size 0,303 μ m	3,48 %	(50 $\pm$ 20)%	Pass
ISO21501-4 Counting efficiency 100%	93,12 % used size 0,510 μ m	3,48 %	(100 $\pm$ 10)%	Pass

Size calibration

Channel	Channel Size	Threshold voltage	Calculated Size	Expanded uncertainty	Calculated Sizing error ($\pm$ 10%)	Pass / Fail
1.	0,30 μ m	50 mV	0,296 μ m	0,0060 μ m	-1,39 %	Pass
2.	0,50 μ m	502 mV	0,507 μ m	0,0071 μ m	1,31 %	Pass
3.	1,00 μ m	1223 mV	0,999 μ m	0,0151 μ m	-0,13 %	Pass
4.	3,00 μ m	3282 mV	3,009 μ m	0,0405 μ m	0,31 %	Pass
5.	5,00 μ m	3830 mV	5,039 μ m	0,0414 μ m	0,79 %	Pass
6.	10,00 μ m	4700 mV	9,991 μ m	0,1614 μ m	-0,09 %	Pass

Notes**Reference Equipment**

Internal ID	Model	Serial Number	Certificate Number	Due date
C63	Definer 220-H	115673	77853	05.04.2023
C118	Jumbo-Digit Stopwatch	221211462	1051-13063162	02.02.2023
C93	MCA 8000D	01665	2111-19947	15.12.2022
C100	Testo 622	3952 1980/909	AF0427 / AD0435	22.12.2022
C109	Solair 3100 GenE	200704044	LH80269	08.12.2022
C97	Remote 2014	191121036	LH79697	22.11.2022

Reference Particle Standards

Size	Description	Due date	Lot#
0,30 μ m	3300A & 3300B, Nanosphere™ Size Standards	Jan-25	248877
0,40 μ m	3400A, Nanosphere™ Size Standards	Aug-23	230332
0,50 μ m	3500 & 3500A, Nanosphere™ Size Standards	Feb-25	250693
1,00 μ m	4009, 4009A & 4009B, DUKE STANDARDS™ Microsphere Size Standards	Dec-24	247589
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5,00 μ m	4D-05, DUKE STANDARDS™ Dry Microsphere Size Standards	Apr-24	239589
10,00 μ m	4D-10, DUKE STANDARDS™ Dry Microsphere Size Standards	Feb-23	221642