

Applicant CCSTEC GmbH
Triesterstrasse 36
2512 Oeynhausen
Österreich

Instrument Type: Airborne Particle Counter
Manufacturer: Lighthouse Worldwide Solutions
Model: Solair 3100
Serial no.: 171004018
Customer device ID.: C89

Date of calibration 1. December 2020

Due date of calibration December 2021

Calibration Location A-2512 Oeynhausen

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

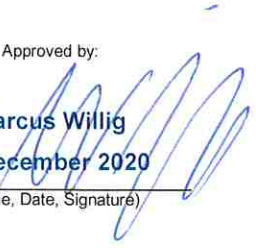
Results The result of the measurements are shown on the following pages.
The unit is readjusted.
All measured values comply with the specification limit(s).

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
1. December 2020
(Name, Date, Signature)

Approved by:

Marcus Willig
1. December 2020
(Name, Date, Signature)

Date of calibration 1. December 2020

Calibrated by Christian Ribarits

Environmental conditions 20,1 °C 42,9 %rF 986,7 hPa

Results, As found

Performance details

Test	Test result	Expanded uncertainty	Criteria	Pass / Fail
ISO21501-4 Flow	28,3 l/min	0,05 l/min	28,3 l/min. +- 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 Timer Check	60,0 sec.	0,03 sec.	±1%	Pass
ISO21501-4 Size resolution	2,55 % used size 0,40 µm	0,77 %	< 15%	Pass
ISO21501-4 Counting efficiency 50%	63,4 % used size 0,30 µm	3,84 %	(50±20)%	Pass
ISO21501-4 Counting efficiency 100%	94,0 % used size 0,50 µm	3,83 %	(100±10)%	Pass

Size calibration

Channel	Channel Size	Threshold voltage	Calculated Size	Expanded uncertainty	Calculated Sizing error (±10%)	Pass / Fail
1.	0,30 µm	47 mV	0,301 µm	0,0061 µm	0,21 %	Pass
2.	0,50 µm	426 mV	0,499 µm	0,0043 µm	-0,26 %	Pass
3.	1,00 µm	1220 mV	1,034 µm	0,0046 µm	3,36 %	Pass
4.	3,00 µm	3142 mV	2,988 µm	0,0032 µm	-0,39 %	Pass
5.	5,00 µm	3696 mV	4,810 µm	0,0050 µm	-3,80 %	Pass
6.	10,00 µm	4582 mV	9,667 µm	0,0050 µm	-3,33 %	Pass

Notes

Reference Equipment

Internal ID	Model	Serial Number	Certificate Number	Due date
C63	Definer 220-H	115673	61493	18.05.2021
C45	Fluke 87 V	87380269	65112019	20.11.2021
Z29	Hanhart Labor 3	4202	20_1439	30.01.2021
C83	MCA 8000D	738	2005-06547	15.05.2021
C94	Testo 622	3951 8351/809	207677	03.03.2021
C99	Solair 3100 GenE	180204002	20_1479	07.02.2021
C91	Remote 2014	180221001	LH48796	27.01.2021

Particle size standards

Size	Description	Due date	Lot#
0,30 µm	DUKE STANDARDS™ Nanosphere Size Standards Particles	Apr-23	223077
0,50 µm	DUKE STANDARDS™ Nanosphere Size Standards Particles	Apr-22	210349
1,00 µm	DUKE STANDARDS™ Microsphere Size Standards Particles	Apr-22	211354
3,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Feb-21	194205
5,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Jan-22	206792
10,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Feb-23	221642

Date of calibration 1. December 2020

Calibrated by Christian Ribarits

Environmental conditions 20,1 °C 42,9 %rF 986,7 hPa

Results, As left

Performance details

Test	Test result	Expanded uncertainty	Criteria	Pass / Fail
ISO21501-4 Flow	28,3 l/min	0,05 l/min	28,3 l/min. +- 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 Timer Check	60,0 sec.	0,03 sec.	±1%	Pass
ISO21501-4 Size resolution	2,55 % used size 0,40 µm	0,77 %	< 15%	Pass
ISO21501-4 Counting efficiency 50%	58,7 % used size 0,30 µm	3,87 %	(50±20)%	Pass
ISO21501-4 Counting efficiency 100%	101,6 % used size 0,50 µm	3,82 %	(100±10)%	Pass

Size calibration

Channel	Channel Size	Threshold voltage	Calculated Size	Expanded uncertainty	Calculated Sizing error (±10%)	Pass / Fail
1.	0,30 µm	50 mV	0,303 µm	0,0061 µm	0,89 %	Pass
2.	0,50 µm	426 mV	0,499 µm	0,0043 µm	-0,26 %	Pass
3.	1,00 µm	1180 mV	1,001 µm	0,0047 µm	0,15 %	Pass
4.	3,00 µm	3142 mV	2,988 µm	0,0032 µm	-0,39 %	Pass
5.	5,00 µm	3745 mV	5,018 µm	0,0048 µm	0,35 %	Pass
6.	10,00 µm	4634 mV	9,993 µm	0,0048 µm	-0,07 %	Pass

Notes

Reference Equipment

Internal ID	Model	Serial Number	Certificate Number	Due date
C63	Definer 220-H	115673	61493	18.05.2021
C45	Fluke 87 V	87380269	65112019	20.11.2021
Z29	Hanhart Labor 3	4202	20_1439	30.01.2021
C83	MCA 8000D	738	2005-06547	15.05.2021
C94	Testo 622	3951 8351/809	207677	03.03.2021
C99	Solair 3100 GenE	180204002	20_1479	07.02.2021
C91	Remote 2014	180221001	LH48796	27.01.2021

Particle size standards

Size	Description	Due date	Lot#
0,30 µm	DUKE STANDARDS™ Nanosphere Size Standards Particles	Apr-23	223077
0,50 µm	DUKE STANDARDS™ Nanosphere Size Standards Particles	Apr-22	210349
1,00 µm	DUKE STANDARDS™ Microsphere Size Standards Particles	Apr-22	211354
3,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Feb-21	194205
5,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Jan-22	206792
10,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Feb-23	221642