

Applicant

CCSTEC GmbH
Triesterstrasse 36
2512 Oeynhausen
Österreich

Instrument

Type: Airborne Particle Counter
Manufacturer: Lighthouse Worldwide Solutions
Model: Solair 3100
Serial no.: 180204002
Customer device ID.: C99

Date of calibration 18. February 2021

Due date of calibration February 2022

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:

Daniel Gruber
18. February 2021
(Name, Date, Signature)

Approved by:

Daniel Zwettler
18. February 2021
(Name, Date, Signature)

Date of calibration 18. February 2021

Calibrated by Daniel Gruber

Environmental conditions 24,3 °C 32,4 %rF 1009,9 hPa

Results, As found

Performance details

Test	Test result	Expanded uncertainty	Criteria	Pass / Fail
ISO21501-4 Flow	27 l/min	0,05 l/min	28,3 l/min. +- 5%	Pass
JIS B 9921 Zero count	0 particles in 5 min.	N/A	≤1 in 5 min.	Pass
ISO21501-4 False count rate	Upper confidence level 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	0,70 % used size 0,40 µm	0,63 %	< 15%	Pass
ISO21501-4 Counting efficiency 50%	53,3 % used size 0,30 µm	3,95 %	(50±20)%	Pass
ISO21501-4 Counting efficiency 100%	103,1 % used size 0,50 µm	3,86 %	(100±10)%	Pass

Size calibration

Channel	Channel Size	Threshold voltage	Calculated Size	Expanded uncertainty	Calculated Sizing error (±10%)	Pass / Fail
1.	0,30 µm	40 mV	0,301 µm	0,0061 µm	0,45 %	Pass
2.	0,50 µm	360 mV	0,510 µm	0,0042 µm	1,92 %	Pass
3.	0,70 µm	755 mV	0,739 µm	0,0031 µm	5,56 %	Pass
4.	1,00 µm	935 mV	1,041 µm	0,0045 µm	4,14 %	Pass
5.	3,00 µm	2970 mV	3,069 µm	0,0032 µm	2,30 %	Pass
6.	5,00 µm	3481 mV	5,002 µm	0,0048 µm	0,04 %	Pass
7.	10,00 µm	4371 mV	10,308 µm	0,0035 µm	3,08 %	Pass
8.	25,00 µm	8800 mV	23,942 µm	0,0150 µm	-4,23 %	Pass

Notes

25,00µm can not be manufactured with dev. <= 2,5%. 25,00µm channel does not comply with ISO-21501-4:2018

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
C98	Hanhart Labor 3	9051	20_2759	14.12.2021
C83	MCA 8000D	738	2005-06547	15.05.2021
C100	Testo 622	3952 1980/909	225235	12.01.2022
C109	Solair 3100 GenE	200704044	LH62859	23.12.2021
C97	Remote 2014	191121036	LH62134	14.12.2021

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
0,70 µm	DUKE STANDARDS™ Nanosphere Size Standards Particles	Oct-21	204048
1,00 µm	DUKE STANDARDS™ Microsphere Size Standards Particles	Apr-22	211354
3,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Sep-21	202646
5,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Jan-22	206792
10,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Apr-21	196944
25,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Sep-21	203046

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Results, As left

Performance details

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ISO21501-4 Flow	28 l/min	0,05 l/min	28,3 l/min. +- 5%	Pass
JIS B 9921 Zero count	0 particles in 5 min.	N/A	≤1 in 5 min.	Pass
ISO21501-4 False count rate	Upper confidence level 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	0,87 % used size 0,40 µm	0,63 %	< 15%	Pass
ISO21501-4 Counting efficiency 50%	55,8 % used size 0,30 µm	4,86 %	(50±20)%	Pass
ISO21501-4 Counting efficiency 100%	103,6 % 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	40 mV	0,303 µm	0,0061 µm	0,98 %	Pass
2.	0,50 µm	323 mV	0,510 µm	0,0042 µm	1,92 %	Pass
3.	0,70 µm	681 mV	0,702 µm	0,0033 µm	0,27 %	Pass
4.	1,00 µm	820 mV	0,993 µm	0,0048 µm	-0,69 %	Pass
5.	3,00 µm	2804 mV	3,007 µm	0,0032 µm	0,22 %	Pass
6.	5,00 µm	3420 mV	5,019 µm	0,0048 µm	0,38 %	Pass
7.	10,00 µm	4160 mV	9,847 µm	0,0037 µm	-1,53 %	Pass
8.	25,00 µm	8800 mV	23,926 µm	0,0150 µm	-4,30 %	Pass

Notes

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