

Applicant

CCSTEC GmbH
Triesterstrasse 36
2512 Oeynhausen
Österreich

Instrument

Type: Airborne Particle Counter
Manufacturer: Lighthouse Worldwide Solutions
Model: Apex P3
Serial no.: 1607105004
Customer device ID.: C101

Date of calibration

6. February 2020

Due date of calibration

February 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.

Inspected by:

Christian Ribarits
6. February 2020

(Name, Date, Signature)

Approved by:

Marcus Willig
6. February 2020

(Name, Date, Signature)

Calibration Service

CCSTEC GesmbH
2512 Oeynhausen

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Austria

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Date of calibration 6. February 2020

Calibrated by Christian Ribarits

Environmental conditions 23,9 °C 33,8 %rF 1002,9 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.	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	2,77 % used size 0,4 µm	0,79 %	< 15%	Pass
ISO21501-4 Counting efficiency 50%	51,1 % used size 0,3 µm	3,974 %	(50±20)%	Pass
ISO21501-4 Counting efficiency 100%	90,5 % used size 0,5 µm	3,925 %	(100±10)%	Pass

Size calibration

Channel	Channel Size	Threshold voltage	Calculated Size	Expanded uncertainty	Calculated Sizing error (±10%)	Pass/ Fail
1.	0,30 µm	79 mV	0,295 µm	0,0062 µm	-1,80 %	Pass
2.	0,50 µm	567 mV	0,485 µm	0,0050 µm	-2,94 %	Pass
3.	1,00 µm	1442 mV	0,961 µm	0,0049 µm	-3,94 %	Pass
4.	5,00 µm	4827 mV	4,825 µm	0,0050 µm	-3,49 %	Pass

Notes

Reference Equipment

Internal ID	Model	Serial Number	Certificate Number	Due to
C63	Definer 220-H	115673	54400	06.06.2020
C45	Fluke 87 V	87380269	65112019	21.11.2020
C98	Hanhart Labor 3	9051	19-1324	06.12.2020
C83	MCA 8000D	738	1902-19195	26.04.2020
C100	Testo 622	3952 1980/909	204005	04.02.2021
C89	Solair 3100 GenE	171004018	LH46484	14.11.2020
C97	Remote 2014	191121036	43795191121036	26.11.2020

Particle size standards

Size	Description	Due to	Lot#
0,30 µm	DUKE STANDARDS™ Nanosphere Size Standards Particles	Oct-20	189903
0,50 µm	DUKE STANDARDS™ Nanosphere Size Standards Particles	Sep-20	188886
1,00 µm	DUKE STANDARDS™ Microsphere Size Standards Particles	Aug-20	187477
5,00 µm	DUKE STANDARDS™ Dry Nanosphere Size Standards Particles	Jan-22	206792

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ISO21501-4 Timer Check	60,0 sec.	0,03 sec.	±1%	Pass
ISO21501-4 Size resolution	2,77 % used size 0,4 µm	0,79 %	< 15%	Pass
ISO21501-4 Counting efficiency 50%	47,8 % used size 0,3 µm	3,83 %	(50±20)%	Pass
ISO21501-4 Counting efficiency 100%	93,3 % used size 0,5 µm	3,882 %	(100±10)%	Pass

Size calibration

Channel	Channel Size	Threshold voltage	Calculated Size	Expanded uncertainty	Calculated Sizing error (±10%)	Pass/ Fail
1.	0,30 µm	90 mV	0,300 µm	0,0061 µm	-0,11 %	Pass
2.	0,50 µm	625 mV	0,508 µm	0,0048 µm	1,56 %	Pass
3.	1,00 µm	1487 mV	0,994 µm	0,0047 µm	-0,58 %	Pass
4.	5,00 µm	4971 mV	5,020 µm	0,0048 µm	0,41 %	Pass

Notes

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