

Applicant
CCSTEC GmbH
Triesterstrasse 36
2512 Oeynhausen
Austria

Instrument
Type: Airborne Particle Counter
Manufacturer: Lighthouse Worldwide Solutions
Model: ApexZ3
Serial no.: 1711141013
Customer device ID.: C107

Date of calibration 2. June 2021

Due date of calibration June 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.
No readjustments are made.
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 Poppinger
2. June 2021

(Name, Date, Signature)

Approved by:

Marcus Willig
2. June 2021

(Name, Date, Signature)

Calibration Service

CCSTEC GesmbH
2512 Oeynhausen

Triesterstraße 36
Austria

Tel: +43 2252/25 27 59-0
E-Mail: office@ccstec.at

Date of calibration 2. June 2021

Calibrated by Daniel Poppinger

Environmental conditions 24,1 °C 39,0 %rF 1027,0 hPa

Results, As found**Performance details**

Test	Test result	Expanded uncertainty	Criteria	Pass / Fail
ISO21501-4 Flow	28,4 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	1,74 % used size 0,40 µm	0,69 %	< 15%	Pass
ISO21501-4 Counting efficiency 50%	59,1 % used size 0,30 µm	3,87 %	(50±20)%	Pass
ISO21501-4 Counting efficiency 100%	92,7 % used size 0,50 µm	3,80 %	(100±10)%	Pass

Size calibration

Channel	Channel Size	Threshold voltage	Calculated Size	Expanded uncertainty	Calculated Sizing error (±10%)	Pass / Fail
1.	0,30 µm	69 mV	0,298 µm	0,0062 µm	-0,60 %	Pass
2.	0,50 µm	601 mV	0,498 µm	0,0043 µm	-0,50 %	Pass
3.	1,00 µm	1579 mV	0,992 µm	0,0048 µm	-0,80 %	Pass
4.	3,00 µm	3298 mV	2,965 µm	0,0033 µm	-1,15 %	Pass
5.	5,00 µm	5334 mV	5,056 µm	0,0004 µm	1,12 %	Pass
6.	10,00 µm	6446 mV	9,894 µm	0,0036 µm	-1,06 %	Pass

Notes**Reference Equipment**

Internal ID	Model	Serial Number	Certificate Number	Due date
C87	Mass Flowmeter 4043	40431653004	66078	08.01.2022
C45	Fluke 87 V	87380269	65112019	20.11.2021
Z29	Hanhart Labor 3	4202	21_2893	02.02.2022
C93	MCA 8000D	01665	2012-03463	10.12.2021
C100	Testo 622	3952 1980/909	225235	12.01.2022
C99	Solair 3100 GenE	180204002	21_3320	07.04.2022
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	Feb-24	236574
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	Apr-24	239589
10,00 µm	DUKE STANDARDS™ Dry Microsphere Size Standards Particles	Jan-22	206793

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