PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

Kunak AIR Pro

Manufactured by:

Kunak Technologies SL
Parque Empresarial La Muga, 9
Floor 4, Office 1 – Orcoyen
Navarra
Spain

has been assessed by CSA Group
and for the conditions stated on this certificate complies with:

MCERTS Performance Standards for Indicative Ambient Particulate Monitors, Environment Agency, August 2017, version 4

Certification ranges:

$PM_{2.5}$ 0-1,500 µg/m^3
PM_{10} 0-2,000 µg/m^3

Project No.:	80150788
Certificate No:	CSA MC230418/00
Initial Certification:	9 June 2023
This Certificate issued:	9 June 2023
Renewal Date:	8 June 2028

Andrew Young
Environmental Team Manager

MCERTS is operated on behalf of the Environment Agency by

CSA Group Testing UK Ltd
Unit 6, Hawarden Industrial Park
Hawarden, Deeside, CH5 3US
Tel: +44 (0)1244 670 900

Form 1335
Issue 11

Certificate Contents

Approved Site Application

Any potential user should make sure, in consultation with the manufacturer, that the monitoring system is suitable for the intended application. For general guidance on monitoring techniques refer to the Environment Agency guidance available at www.mcerts.net

The indicative dust monitoring analyser(s) can be operated in one of two ways:

For qualitative measurements: Providing qualitative measurement data for the analysis of particulate pollution trends, and source identification studies based for example on pollution roses etc. Such application can rely on instrument factory calibration only.

For quantitative measurements: Providing measurement data with the uncertainty defined for indicative instruments (+/- 50%). This can be achieved on condition that each instrument used for measurement has been calibrated on the specific site where monitoring is taking place against a standard reference method for a period of two weeks and the resulting slope and intercept have been used for instrument calibration. Using non-standard filters and procedures for this purpose is not acceptable. To maintain the validity of data this calibration has to be repeated at least every twelve months or when the instrument is moved to a different site.

They **cannot** be used on national automatic monitoring networks for compliance reporting against the Ambient Air Quality Directives.

The field tests were carried out from the 1 April 2022 to the 7 February 2023 on two candidate 'Kunak AIR Pro' samplers, collocated with a Palas Fidas 200 (the reference method). The location of the field test was University of Manchester, Fallowfield, Manchester, UK. The serial numbers of the two 'Kunak AIR Pro' monitors were '0321 180036' and '0321 180037'.

Basis of Certification

This certification is based on the following test report(s) and on CSA Group's assessment and ongoing surveillance of the product and the manufacturing process:

Bureau Veritas, test report ref. AIR17810339, dated June 2023, "Kunak, Test of the Air Pro for use as an Indicative Monitor for PM_{10} and $PM_{2.5}$"

Product Certified

The ‘Kunak AIR Pro’ measuring system consists of the following parts:

- Base Station includes data storage with eSIM cellular communications.
- Power Pack embedded in the base station.
- Particulate sensor cartridge to measure $PM_{2.5}$ and PM_{10}.
- Solar protected shield.

Sensor type and firmware version
Alphasense OPC-N3 with firmware version 1.32.DT

Algorithm Version (note 5.)
KAIR_OPCN3_31

The particle firmware - Senor type OPC-N3 firmware version 1.17a.B with algorithm version KAIR_OPCN3_30.

This certificate applies to all instruments fitted with serial number 0321 180037 onwards.

Certified Performance

Test (***Laboratory***)	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Constancy of the sample volumetric flow					Not applicable Note 1	To remain constant within ± 3%
Tightness of the sampling system			1.44%			Leakage not to exceed 2% of sampled volume

Test (**Field**)	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Intra-instrument uncertainty for the reference method						
PM_{10}					0.33µg/m^3	≤2.5µg/m^3
$PM_{2.5}$					0.25µg/m^3	≤2.5µg/m^3
Intra-instrument uncertainty for the candidate method						
PM_{10}						
All data (n=306)					1.74µg/m^3	≤5µg/m^3 for all data as well as for the subsets: < or ≥ 30 µg/m^3
≥ 30 µg/m^3 (n=4)					2.47µg/m^3	
< 30 µg/m^3 (n=302)					1.74µg/m^3	
$PM_{2.5}$						
All data (n=306)					0.81µg/m^3	≤5µg/m^3 for all data as well as for the subsets: < or ≥ 30 µg/m^3
≥ 18 µg/m^3 (n=14)					1.64µg/m^3	
< 18 µg/m^3 (n=292)					0.75µg/m^3	
Highest resulting uncertainty estimate comparison against data quality objective (Measurement Uncertainty)						W_{CM}≤50% $W_{CM} \leq W_{dpo}$ (W_{dpo} Measurement uncertainty defined as 50% for indicative instruments)
PM_{10}						
All data (n=306)					81.1%	
All data (slope corrected) (n=306)					12.2% (note 2)	
≥ 30 µg/m^3 (slope corrected) (n=4)					46.6%	
$PM_{2.5}$						
All data (n=306)					67.0%	
All data (slope corrected) (n=306)					10.6% (note 3)	
≥ 18 µg/m^3 (slope corrected) (n=14)					40.9% (note 3)	
Maintenance Interval					44 weeks Note 4	≥2 weeks

Note 1 - The Kunak AIR Pro utilises a fan and not a pump, therefore it was agreed that this test was not applicable.
Note 2 - This data was slope corrected by dividing by 0.596. All users must slope correct PM_{10} data by dividing by 0.596 - it is recommended that the manufacturer program this value into their algorithm in order to avoid confusion to end users. End users should check with the manufacturers that this has been carried out.
Note 3 - This data was slope corrected by dividing by 0.667. All users must slope correct $PM_{2.5}$ data by dividing by 0.667 - it is recommended that the manufacturer program this value into their algorithm in order to avoid confusion to end users. End users should check with the manufacturers that this has been carried out.
Note 4 - Maintenance - the manufacturer recommends that users clean the PM inlet if it becomes dirty. If a problem arises, such as sensor malfunction or obstruction, then the software will detect it automatically and will invalidate the measurements and advise the user to carry out specific maintenance. It is further recommended to change the PM sensor after 2 years operation.
Note 5 - The Kunak AIR Pro must be set up using the configuration, as follows; i) Alphasense OPC-N3 sensor with firmware version '1.32.DT', and ii) Algorithm version: KAIR_OPCN3_31. The firmware version incorporates slope correction – firmware version '31' is approved and no slope correction required.

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Description

The Kunak AIR Pro has a particulate matter sensor that consists of an optical particle counter (OPC) capable of measuring particles from 0.3µm up to 40µm. $PM_{2.5}$ and PM_{10} are calculated assuming a particle density profile.
The effect of humidity is corrected using the embedded algorithm. The particle size distributions are available on Kunak Cloud.

The Kunak AIR Pro communicates using GPRS, 3G, 4G, ethernet and Modbus RTE Slave. Secure encryption and direct communication protocols, results in bi-directional communications and facilitates remote configuration, firmware update and sensor calibration of the devices through the Kunak Cloud web platform.

Kunak AIR Pro is equipped with an internal rechargeable battery. The battery can be powered either through a small solar panel to facilitate the installation of the device or by an outdoor charger to via the main network.

General Notes

1. This certificate is based upon the equipment tested. The Manufacturer is responsible for ensuring that on-going production complies with the standard(s) and performance criteria defined in this certificate. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management system shall be subject to regular surveillance according to 'Regulations Applicable to the Holders of CSA Group Testing UK Ltd Certificates'.

2. The design of the product certified is defined in the CSA Group design schedule V00 for certificate no. CSA MC230418/00.

3. If a certified product is found not to comply, CSA Group should be notified immediately at the address shown on this certificate.

4. The certification marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of CSA Group Testing UK Ltd Certificates'.

5. This document remains the property of CSA Group and shall be returned when requested by CSA Group.