JOINT RESEARCH CENTRE
Directorate F – Health, Consumers and Reference Materials

REFERENCE MATERIAL CERTIFICATE

ERM®- CZ110

FINE DUST ($PM_{2,5}$-LIKE)		
Mass Fraction		
	Certified value [3] [g/kg]	Uncertainty [4] [g/kg]
Na^{+} [1]	20.4	2.0
K^{+} [1]	3.3	0.5
Ca^{2+} [1]	44	9
Mg^{2+} [1]	1.8	0.4
Cl^{-} [2]	26.2	2.1
NO_3^{-} [2]	7.8	0.7
SO_4^{2-} [2]	75	13

1) Water-soluble ions extracted as described in CEN/TR 16269:2011 or EN 16913:2017.

2) Water-soluble ions extracted as described in CEN/TR 16269:2011 or EN 16913:2017 and subsequent determination by IC-CD.

3) Certified values are values that fulfil the highest standards of accuracy and represent the unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory and/or with a different method of determination. The certified value and its uncertainty are traceable to the International System of units (SI).

4) The uncertainty is the expanded uncertainty of the certified value with a coverage factor k = 2 corresponding to a level of confidence of about 95 % estimated in accordance with ISO 17034:2016 and ISO Guide 35:2017.

This certificate is valid for one year after purchase.

Sales date:

The minimum amount of sample to be used is 5 mg.

Geel, October 2020

Signed: R. Koeber

Dr Robert Koeber
Head of Unit Reference Materials
European Commission, Joint Research Centre
Directorate F – Health, Consumers and Reference Materials
Retieseweg 111
B-2440 Geel, Belgium

Indicative Value		
Mass Fraction		
	Indicative value [2] [g/kg]	Uncertainty [3] [g/kg]
NH_4^+ [1]	1.3	0.5

1) Water-soluble ions extracted as described in CEN/TR 16269:2011 or EN 16913:2017.

2) Indicative values are values where either the uncertainty is deemed too large or where too few independent datasets are available to allow certification and are therefore less reliable than certified values. Great caution should be used when using these values. The given value is an unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory and/or with a different method of determination. The indicative value and its uncertainty are traceable to the International System of Units (SI).

3) The uncertainty of the indicative value is the expanded uncertainty with a coverage factor k = 2 corresponding to a level of confidence of about 95 % estimated in accordance with ISO 17034:2016 and ISO Guide 35:2017.

Additional Material Information	
Mass Fraction	
	Value [2] [g/kg]
Na [1]	23
K [1]	8.5
Ca [1]	65
Mg [1]	9.2

1) Total element content

2) These values refer to values that were obtained in the course of the study. They are stated without an uncertainty and give merely information about other material properties that may be of interest for the user. The given values are unweighted mean values of the means of accepted sets of data each set being obtained in a different laboratory with a different method of determination. Despite the number of accepted sets of data available (8 or more), there is no information regarding between-unit inhomogeneity and potential degradation during transport or long-term storage; for this reason the values are reported without uncertainty. These values are traceable to the International System of Units (SI).

DESCRIPTION OF THE MATERIAL

ERM-CZ110 is a fine particles ($PM_{2,5}$-like) material prepared from particulate matter collected from a road tunnel in Poland. The CRM is available in glass vials containing at least 150 mg of powder. Filling was done under nitrogen atmosphere.

ANALYTICAL METHODS USED FOR CERTIFICATION

Continuous flow analysis - photometry (water-soluble ions)

Inductively coupled plasma - mass spectrometry (total element content)

Inductively coupled plasma - optical emission spectrometry (water-soluble ions, total element content)

Inductively coupled plasma - sector field mass spectrometry (water-soluble ions, total element content)

Ion chromatography - conductivity detector (water-soluble ions)

k_0 - Neutron activation analysis (total element content)

PARTICIPANTS

European Commission, Joint Research Centre, Directorate F – Health, Consumers and Reference Materials, Geel, BE
(accredited to ISO 17034 for production of certified reference materials, BELAC No. 268-RM)

Aarhus University, DCE - Danish Centre for Environment and Energy, Roskilde, DK (measurements under the scope of ISO/IEC 17025 accreditation DANAK No. 411)

ALS Scandinavia AB, Luleå, SE
(measurements under the scope of ISO/IEC 17025 accreditation SWEDAC No. 2030)

BAM, Bundesanstalt für Materialforschung und – prüfung, Berlin, DE
(measurements under the scope of ISO/IEC 17025 accreditation DAkkS D-PL-11075-14-00)

EKUK, Eesti Keskkonnauuringute Keskus, Tallin, EE
(measurements under the scope of ISO/IEC 17025 accreditation EAK No. L008)

Fera Science Ltd, York, UK
(measurements under the scope of ISO/IEC 17025 accreditation UKAS No. 1642)

Finnish Meteorological Institute, Helsinki, FI
(measurements under the scope of ISO/IEC 17025 accreditation FINAS No. T097)

INERIS, Institut National de l'Environnement Industriel et des Risques, Verneuil-en-Halatte, FR

ISPRA, Istituto Superiore per la Protezione e la Ricerca Ambientale, Rome, IT
(measurements under the scope of ISO/IEC 17025 accreditation ACCREDIA Lab No. 1562)

IVL, Swedish Environmental Research Institute, Göteborg, SE
(measurements under the scope of ISO/IEC 17025 accreditation SWEDAC No. 1213)

Jožef Stefan Institute, Ljubljana, SI
(measurements under the scope of ISO/IEC 17025 accreditation SA No. LP-090)

LNE, Laboratoire National de Métrologie et d'Essais, Paris, FR
(measurements under the scope of ISO/IEC 17025 accreditation COFRAC No. 2-54)

NILU, Norsk institutt for luftforskning, Kjeller, NO
(measurements under the scope of ISO/IEC 17025 accreditation NA TEST 008)

TNO, Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Utrecht, NL
(measurements under the scope of ISO/IEC 17025 accreditation RvA No. L026)

Umweltbundesamt GmbH, Vienna, AT
(measurements under the scope of ISO/IEC 17025 accreditation AA No. 0200)

VITO NV, Vlaamse Instelling voor Technologisch Onderzoek, Mol, BE

SAFETY INFORMATION

The usual laboratory safety precautions apply. As the material consists of fine particles, appropriate protection against inhalation is also recommended.

INTENDED USE

The main purpose of this material is to assess method performance, i.e. for checking accuracy of analytical results. As any reference material, it can also be used for control charts or validation studies.

INSTRUCTIONS FOR USE

The material must be re-homogenised by repeatedly turning over the bottle for at least two minutes before opening.

Care should be taken to avoid any change of the moisture content once the units are open, as the material is slightly hygroscopic. To maintain the pick-up of water below 1 % relative to the mass, the maximum handling time should be about 15 minutes. The user should close any vial immediately after taking a sample.

The minimum amount of sample to be used is 5 mg.

For water-soluble ions measurements, samples shall be extracted as described in CEN/TR 16269:2011 or EN 16913:2017.

Do note that once placed in water, the sample could foam slightly. This is due to the surfactant (Triton® X-100) used during the processing of the material.

The material shall be disposed in accordance with good laboratory practice.

For general information on handling of reference materials, please see ERM Application Note 6, available on https://crm.jrc.ec.europa.eu/e/132/User-support-Application-Notes.

STORAGE

The materials should be stored at (4 ± 3) °C in the dark.

For more information regarding the shelf life of reference materials, please see ERM Application Note 7, available on https://crm.jrc.ec.europa.eu/e/132/User-support-Application-Notes.

Please note that the stability of opened samples has not been tested and repeated use of the material occurs under the responsibility of the user. The European Commission cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially of opened samples.

LEGAL NOTICE

Neither the European Commission, its contractors nor any person acting on their behalf:

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NOTE

A detailed certification report is available at https://crm.jrc.ec.europa.eu/.

A paper copy can be obtained from the Joint Research Centre, Directorate F – Health, Consumers and Reference Materials on request.

European Commission – Joint Research Centre
Directorate F – Health, Consumers and Reference Materials
Retieseweg 111, B - 2440 Geel (Belgium)
Telephone: +32-(0)14-571.705 - Fax: +32-(0)14-590.406
jrc-rm-distribution@ec.europa.eu