D8: Letter from CEN/TC264/WG8 confirming that the results from this project, related to the traceable calibration of elemental and oxidised mercury gas generators, will be incorporated into documentary standards developed within the WG

19NRM03 SI-Hg D8

Lead partner:	VSL
Version No.:	1
Due date deliverable:	30-09-2023
Actual submission date:	29-11-2023

This project has received funding from the EMPIR programme co-financed by the Participating States and from the European Union's Horizon 2020 research and innovation programme.

Summary

By then end of the SI-Hg project, partner VSL requested a letter from CEN/TC264 “Air Quality” WG8 “Measurement of total mercury emissions” to confirm that the results from the project will be incorporated in documentary standards developed within the WG. During the course of the SI-Hg project, partners VSL, PSA and JSI gave project updates during 6 WG8 meetings.

Table of Contents

1. Letter

Iris de Krom
VSL
Thijsseweg 11
2629 JA Delft
The Netherlands

Subject Output SI-Hg for documentary standards **Date** 2023-10-24

Dear Ms.de Krom,

In capacity as secretary of CEN/TC 264/WG 8 'Measurement of total mercury emissions' I'm writing you this letter regarding the results of the normative SI/Hg project. CEN/TC 264/WG 8 likes to congratulate you and the members of the SI-Hg project with the results you've achieved.

Furthermore this letter is written to follow-up on the results of the SI-Hg-project. In the past, intent was stated to use the results of the SI-Hg-project to write documentary standards within CEN/TC 264/WG 8.

In 2020 an Preliminary Work Item (PWI) (added as an appendix) was established by vote within CEN and it's members. This PWI described the intent to prepare new documentary standards that cover the calibration of elemental and oxidised mercury gas generators underpinning SI-traceable mercury concentration measurements in air. The PWI is currently on hold, but the intention is to re-activate this PWI at the January meeting of CEN/TC 264/WG 8 in 2024. The output of the SI-Hg project will be fundamental to support this PWI.

Furthermore CEN/TC 264/WG 8 included developments in the project in the publication of EN 14884:2022 "Stationary source emissions - Determination of total mercury - Automated measuring systems":

- NOTE: *Protocols for the calibration of both elemental and oxidised mercury generators are under development within the 'European Metrology Programme for Innovation and Research (EMPIR) project 19NRM03 SI-Hg'. This project is also assessing the stability of mercury containing solutions that are used within the generators.*
- *Section 6.2.2. Zero and span check (EN 14181:2014, Annex A.7): Elemental mercury shall be used for the independent span check provided that the reference material generator used by the test laboratory is calibrated according to ISO/IEC 17025:2018 with metrological traceability to the SI units.*

As a conclusion I'd like to state on behalf of CEN/TC 264/WG 8 that the results of the SI-Hg project will be used for PWI, the development of documentary standards and as input for other standards within CEN/TC 264/WG 8.

On behalf of CEN/TC 264/WG 8,

Jacobien Boehmer
Secretary of CEN/TC 264/WG 8

Andrew Curtis

Convenor of CEN/TC 264/WG 8

Annex 1

New Work Item Proposal	
Air quality – Emissions – Total mercury	
Secretariat: DIN	Proposal documented in N xx
Date of circulation:	Closing date for voting:

Proposal

0. This proposal relates to

☐ the creation of a new project in the committee's work programme (stage 10.99)

☒ the creation of a preliminary project in the committee's work programme (stage 00.60)

☐ the activation of a project currently registered as a Preliminary Work Item in the committee's work programme: PWI *XXXXX*

1. Deliverable

☒ European Standard (EN)

☐ Harmonization Document (HD) – *for CENELEC only*

☐ Technical Specification (TS)

☐ Technical Report (TR)

2. This item corresponds to

☒ A new project

☐ An amendment to the EN *XXX*

☐ The revision of EN *XXX*

☐ The conversion of TS *XXX* into an EN

☐ The conversion of ENV *XXX* into an EN

☐ The revision of TS *XXX*

☐ The revision of TR *XXX*

3. Explain the purpose and give a justification for this proposal

Mercury generators are currently used for the calibration of equipment to monitor mercury concentrations in gas emission sources and in the atmosphere. Metrologically traceable protocols for elemental mercury (Hg^0) and oxidised mercury (Hg^{2+}) generators are needed for the generation of comparable data to assess the effectiveness of measures undertaken by national and international legislation and standardisation.

The role of CEN/TC264/WG8 "Emissions - Total mercury" is to produce standardised methods in compliance with the Industrial Emissions Directive (IED) and the Hazardous Waste Incineration Directive (HWID). Currently WG8 is focusing on the development of standards methods for the measurement of Hg concentrations in emissions using sorbent traps and automated total mercury measuring systems (prEN 14884 rev) and stationary source emissions (EN 14385 rev). Although many efforts have been made in developing primary mercury standards, measurements of mercury remain a big challenge and there is no standardised procedure that ensures the uptake of metrological traceability in the field.

Currently mercury generators are available on the market and they are used for the calibration of equipment installed at monitoring stations to measure mercury concentrations. These measurements are covering both Hg^0 and Hg^{2+} concentrations in gaseous emission sources and in the atmosphere. However, these generators systems are not certified against primary standards and therefore, lacking traceability to the international system of units, the SI. Different references for these calibrations are used, leading to discrepancies in the measurement data. Hence, the current practice cannot ensure the reliability of the measurement data obtained at the monitoring stations. A scientifically sound certification protocol, in the form of a formally recognised documentary standard, is essential to guarantee the accuracy and comparability of the mercury measurement data in Europe and globally. At the moment it is not possible to defensibly assess mercury at relevant concentration levels in European directives, because of a lack of underpinning traceability and validated methodologies for low concentrations and for different mercury species.

The United States Environmental Protection Agency (US EPA) in collaboration with the National Institute of Standards and Technology (NIST) have developed interim protocols for establishing traceability of Hg^0 generators and Hg^{2+} evaporative generators. These interim protocols reflect the current state of the art with respect to procedures for generating and using mercury calibration standards in the US. Meanwhile in Europe traceable methods and calibration standards for Hg^0 are based upon mercury vapour pressure equations that currently differ from each other. Furthermore, the actual output concentration of Hg generators is not always in agreement to the theoretical output and also poor agreement between elemental and oxidized mercury generators is often encountered. This discrepancy is of great concern therefore valuable steps to develop measurement methods and primary standards for mercury in the gas phase have been made within the Part Emission EMRP project (2010 – 2013) and the MeTra (Traceability for mercury measurements) EMRP project (2013 – 2016). Such a primary standard can be used for the direct calibration of Hg^0 analysers and certification of Hg^0 generators used in the field. The developed methods considerable strengthen the Hg^0 traceability chain at emission and ambient levels which is essential to control and assess mercury concentrations in the environment. Currently within the MercOx (Metrology for oxidised mercury) EMPIR project (2017 – 2020) a primary mercury standard is used to establish a traceable calibration methodology for the most important oxidised mercury-containing species, especially for $HgCl_2$. A certification protocol for liquid evaporative Hg^{2+} generators is under development within the MercOx project to cover higher mercury concentrations present in emission sources and a feasibility study of the protocol is carried out.

4. Stakeholder categories immediately affected by the proposal

☒ Industry and commerce	☐ Societal consumer groups	☒ Standards application
☐ SMEs	☐ Labour	☒ Non-governmental organization (NGO)
☒ Government	☒ Academic and research bodies	☒ Environmental stakeholders
☐ Consumers		
☐ None of the above categories		

5. How will these Stakeholders benefit from or be impacted by the proposed deliverable?

Mercury poses the greatest current direct threat to human, animal and environmental health across the globe. Robust, defensible and traceable measurements of mercury are essential to underpin global effort to reduce the concentration of mercury in the environment, meet the obligations of legislation and to protect human health.

Suppliers of mercury analysers and generators will be able to supply certified and traceable systems for measuring mercury concentrations in air. Consequently, the monitoring stations and laboratories will be able to improve the quality and reliability of their mercury measurement data. This will greatly increase the quality, comparability and traceability of mercury measurement results, providing SI traceability for all mercury measurements required by current European and international standardisation and legislation. This is of fundamental importance for the evaluation of the efficiency of the implementation of Minamata Convention, as required by Article 22.

6. Document developed in drafting body

☒ Existing drafting body *(please give name and title)*:

CEN/TC 264/WG 8 'Mercury emissions'

☐ New drafting body *(please give name and title)*:

7. Titles

English title: Stationary Source Emissions - Calibration of elemental and oxidised mercury gas generators for SI-traceable mercury concentration measurements in air

French title:
(*Optional*)

German title:
(*Optional*)

8. Scope

The standards provide procedures for the calibration and performance evaluation of elemental and oxidised mercury gas generators with metrological traceability to the SI-units. The standard describes two ways to calibrate the output of a gas generator

1. Direct calibration of the output of a gas generator against a primary reference material.
2. Calibration of the output of a gas generator by comparison with a primary calibrated gas generator under option 1.

The aim of these methods for calibrating mercury gas generators is to make mercury concentration measurement results traceable to SI-units. For regulatory purposes, Hg calibration standards of known concentration and uncertainty are needed to quality assure data recorded at monitoring stations.

9. Proposed Project Leader (including contact details) - *Optional*

Dr. Iris de Krom
VSL B.V.
Thijsseweg 11
2629 JA Delft
The Netherlands
0031 (0) 15 269 1500
idekrom@vsl.nl

Dr. Warren T Corns
P S Analytical, Arthur House, Main Road, Orpington, Kent, BR5 3HP, UK
0044 (0) 1689 891211,
wtc@psanalytical.com

10. Accessibility aspects

See CEN-CENELEC Guide 6:2014 Guide for addressing accessibility in standards

☐ Accessibility aspects are relevant for this NWI *(please indicate which ones):*

☒ Accessibility aspects are not relevant for this NWI

Please provide a written explanation detailing why Accessibility aspects do not apply to the current proposed WI:

11. Environmental aspects

☐ Discharges to soil	☐ Discharges to water	☒ Emission to air
☐ Heat	☐ Noise/Vibration	☐ Other effects on biodiversity
☐ Radiation	☐ Use of energy	☐ Use of land
☐ Use of material	☐ Use of water	☐ Waste

☐ Risk to the environment from accidents/misuse

☐ Other:

☐ None of the above.

Please provide a written explanation detailing why these environmental aspects do not apply to the current proposed WI:

12. How do you plan to address these environmental aspects?

☒ Bring in environmental expertise to the WG

☐ Contact EHD for help/support (cen.ehd@cencenelec.eu)

☐ Use of environmental checklist

☐ Other:

13. Vienna/Frankfurt Agreement (parallel procedure)

☒ No or Vienna Agreement expected CEN lead

For CENELEC only – please give a justification for not offering the project to IEC:

☐ Yes – Vienna Agreement Parallel ISO Lead

ISO project reference:
ISO project ID:
ISO TC:

☐ Yes – Frankfurt Agreement *(project to be offered to IEC)*

14. The project is based on

☐ No document from another organization

☐ An ISO/IEC document (not covered by a parallel procedure)

☐ Identical

☐ Non-identical

ISO/IEC project reference:
ISO/IEC project ID:
Publication date:

☒ A document from another organization:

☐ Identical

☒ Non-identical

Organization name: NIST
Document reference: 1. Interim Elemental Mercury Gas Traceability Protocol
2. Interim Oxidized Mercury Gas Traceability Protocol
Publication date: 1 and 2: July 2009

15. Please indicate whether the proposed project is linked to a specific European Research and Innovation Project

☐ **No**

☒ **Yes**

Research and/or Innovation project code: EMPIR 16ENV01
Research and/or Innovation project acronym: MercOx
Research and/or Innovation project title: Metrology for Oxidised Mercury

16. Track

☒ Enquiry + Formal Vote

☐ Enquiry + COCOR + Formal Vote *(for ECISS/TCs only)*

☐ Unique Acceptance Procedure (UAP) – *for CEN, BT approval is required*

☐ Vote on TS or TR by correspondence

17. Please provide the target dates for the below key stages:

For ENs:	For UAPs, TSs and TRs:
Dispatch of 1st Working Draft (20.60):	Dispatch of 1st Working Draft (20.60):
Dispatch of Enquiry Draft (30.99):	Dispatch of Draft for Vote (30.99):
Dispatch of Formal Vote Draft (45.99):	

18. Related standardization request(s) (formerly mandate):

☒ No

☐ Yes *(please specify)*:

19. Related directive(s)

☒ No

☐ Yes

Directive reference	Candidate for citation in Official Journal?
	☐ No ☐ Yes
	☐ No ☐ Yes

20. Relation to other legislation or established public policy.

☒ No

☐ Yes

Please specify which legislation or established public policy is/are in relation with the proposed project:

21. Is the proposed project covered by Intellectual Property Rights (IPR)?

Please indicate whether there is any knowledge of items covered by IPR(s), for instance patents, copyright, trademark, etc.

☒ No

☐ Yes

Please provide full information about these items and the identified IPR(s):

22. Commitment – *for CENELEC only, to be completed for NWI request to CENELEC/BT*

The following CENELEC members (at least five) are committed to participate in the development of the project: