



EURAMET Project			TC-Q
Ref. No. / started:	Subject field:	Title:	Participants:
1347 / 2014-11	Quality	On site peer review	CMI, NPL

PERIODICAL/EXTRAORDINARY PEER REVIEW RECORD

NMI or DI visited: CMI (Czech Republic)		
Visit Start date: 25 November 2014		Visit End date: 25 November 2014
Names and affiliations of the reviewer(s)		
Name	Affiliation	Signature
Dr Andrew Brown	NPL (UK)	
Assigned responsible person of the visited NMI or DI		
Name	Position	Signature
Ing. Jan Beránek	Head of Department	
<p>Programme of the on-site visit (e.g. ranges of CMCs specified by Internal NMI Service Identifiers) :</p> <p>An ISO 17025-assessment was performed on CMI's gas analysis laboratories. The technical part of the visit focussed on CMI's capabilities for certifying mixtures of synthetic natural gas. CMI are planning to apply for CMCs for this capability in CMC Cycle XVI. The technical issues assessed were:</p> <ul style="list-style-type: none"> • Documentary procedures • Traceability • Assignment of values and uncertainties by analysis (verification or certification) • Stability and homogeneity • Performance in comparisons <p>The management issues assessed were:</p> <ul style="list-style-type: none"> • Organisation and management <ul style="list-style-type: none"> ○ Quality system ○ Group structure ○ Training / staff records ○ Documents control ○ Internal audits • Customer work <ul style="list-style-type: none"> ○ Certificates (content; system for approval) ○ Handling of complaints / corrective actions 		

Forwarded documentation

	submitted (tick if YES)	accepted / approved (tick if YES)
Quality manual	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
List of used procedures	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
List of completed comparisons	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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List of services included in the App. C of the MRA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reference written standards	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Other documentation (comments if necessary)

Final report of CCQM-K23 (natural gas)

Final report of EURAMET.QM-S9/1212 (natural gas)

CMI proficiency testing report MPZ 75-1600-13 (natural gas)

Review findings

1. Non-conformities

Serial No.	Name, notation	Description
NC14-01	Calculations	The uncertainty calculations performed did not include the repeatability of the GC peak areas. It did however appear that the uncertainty of the measurement is currently dominated by the uncertainty in the certified values of the reference materials. Also, the calculations of amount fraction were based on the normalised percentage amount fractions reported by the GC, rather than using the raw peak areas.
NC14-02	Calibration curves	The calibration curves are automatically produced by the GC. These were not available for inspection, so it could not be determined if the fits to the data were of sufficient quality.
NC14-03	Repeat measurements	Guidance regarding the number of repeat measurements required is currently not given in procedure 114-MP-C003.
NC14-04	Spreadsheets	The spreadsheet inspected for the calculation of calorific value was not protected and contained a minor error: the \sqrt{b} factor for n-butane was stated as 0.17819, not 0.1781.
NC14-05	Comparisons	No plans were in place to participate in future natural gas comparisons, for example the CCQM-K118 comparison planned for 2015.
NC14-06	Certificates	An error was noted on certificate 1014-PT-75107-13: no units were stated in the table of results.

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2. Recommendations, opportunities for improvement

Serial No.	Name, notation	Description
R14-01	Outlier tests	An outlier test is currently not performed on the repeated measurements obtained from the GC. This did not seem to be an issue with the datasets inspected, but it is recommended that consideration is given to introducing an outlier test into the data analysis procedure. Alternatively, a limit for the maximum standard deviation of repeated measurements could be set
R14-02	Sampling lines	A number of the sampling lines used are very long. Reducing the length of these sampling lines, and using regulators with smaller internal volumes is likely to significantly reduce the number of measurements required before a stable reading is obtained.
R14-03	Internal audits	While internal audits of the quality and management system appeared to be performed regularly and in a robust fashion, it was not obvious if technical internal audits were carried out on the scientists authorised to carry out the technical work. Consideration should be given to the use of technical audits.

3. Adequacy of metrology institute's quality system and its implementation to demonstrate the conformity with the requirements of CIPM-MRA.

- ☒ **YES**, Quality system of the institute is adequate
- ☐ **NO**, Adequacy of the Institute's quality system was not recognized

Agreed actions taken to correct no-conformities and deadlines



Action No.	Subject matter	Deadline	Requested document (if applicable)
NC14-01	Check the validity of the current calculations by taking one existing dataset as an example. Use the raw peak areas to generate a calibration curve (ideally generalised least squares following ISO 6143) and calculate the amount fraction and uncertainty of each components in the unknown mixture.	30.01.2015	Summary of results of data analysis
NC14-02	Provide examples of typical GC-generated calibration curves for inspection	30.01.2015	Short document
NC14-03	Add guidance regarding the number of repeat measurements to procedure 114-MP-C003.	30.01.2015	Updated procedure
NC14-04	Correct the error in the calorific value spreadsheet, and ensure that this and other critical spreadsheets are protected	30.01.2015	Amended spreadsheet
Euramet project No. 1341 (2014-11)		Annex I - CMI Nov14 Draft v2, Meistrova	Pg. 3 / 4

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NC14-05	Register for the CCQM-K118 comparison planned for 2015, or provide evidence of a plan to participate in a future natural gas comparison	19.12.2014	Details of plans for participation in a future comparison
NC14-06	Correct the error on certificate 1014-PT-75107-13	30.01.2015	Evidence that the customer has received a corrected certificate

An explanation of any significant differences of opinion (free text)

Representative of institute visited:

Quality manager	Name: Jana Meistrova	Signature: 	Date: 11 th December 2014
Assigned responsible person	Name: Jana Beranek	Signature: 	Date: