



RESPONSE FORM

Standardization needs and suggestions to EURAMET for consideration in their upcoming EMPIR calls

In the frame of the between CEN, CENELEC and EURAMET, CEN and CENELEC have been invited by the EURAMET Management to put forward their **testing and measurement needs in research** for consideration by metrology institutes for future calls under EMPIR.*

Relevant technical groups (sector fora, advisory boards, coordination groups, TCs...) are invited to contribute with:

- a short introduction or an overview paper of their unaddressed standardization needs for testing and measurement, and
- a contact person (secretary, chair, convenor, liaison officer, etc.) whom proposers for the Potential Research Topics can contact,

by using this Response Form and send it at any time during the year to:

STAIR EMPIR WG, Mr Ortwin Costenoble : empir@nen.nl

Please note that you have an opportunity to discuss this need with a metrology researcher if you or representatives of your group attend the **STAIR EMPIR meeting of 10th October 2017** in CCMC - Brussels. Please indicate your interest below.

Source of the identified need (identification of TC, WG, etc, incl. title)	<input checked="" type="checkbox"/> CEN/TC 318 - Hydrometry/WG 12 – Measurement of rainfall intensity <input type="checkbox"/> CLC/TC 0/WG 0 <input type="checkbox"/> ISO/TC 0/SC 0 / WG 0 <input type="checkbox"/> IEC/TC 0/SC 0 / WG 0 <input type="checkbox"/> Other, namely <i>Identification, Title</i>
European entity responsible for submission of the need	<i>CEN/CLC TC 318: Hydrometry</i>
Person that can be contacted for more detail (name, e-mail and telephone number)	<i>Luca G. Lanza luca.lanza@unige.it +39-010-3532123 ITALY</i>
Unaddressed need (short description)	<p>Calibration and accuracy of non-catching instruments to measure liquid/solid atmospheric precipitation</p> <p>The need of comparing atmospheric liquid/solid precipitation measurements from various regions, performed by different operational networks, and using different instruments is the main justification behind the proposed research topic. Climate studies, as well as everyday hydrological, meteorological, and agricultural applications rely on such measurements. Meaningful comparison and data interpretation can only be performed when a common ground for evaluating the measurement uncertainty is provided. This is not presently the case for liquid/solid precipitation measurements, and users and/or manufacturers adopt very simple non-standardised calibration methods.</p>

	<p>Non-catching type gauges have a number of advantages over the more common catching-type gauges, including the possibility to provide further information than the precipitation intensity alone (e.g. the Drop Size Distribution, visibility, etc.), and are especially suitable for Automatic Weather Stations. National weather services and other users are increasingly adopting this type of gauges in their network.</p> <p>In order to support their wider use, and as a development beyond the new item adopted under CEN TC318 for catching type gauges, traceable instrument calibration methods for non-catching gauges used to measure precipitation amount and intensity must be developed. This would allow establishing a sound metrological basis for the evaluation of standard uncertainty for the relevant sources of uncertainty in the instrument calibration procedure. In addition, suitable laboratory tests are needed to determine the Type-A evaluation of standard uncertainty, based on valid statistical methods. Standardised procedures for the laboratory calibration of non-catching gauges are also needed, with the associated calibration uncertainty assessment and repeatability features.</p>
<p>Further explanation of need (TC business plan, road map, formal decision, work item, etc.)</p>	<p>Despite the relevance of atmospheric liquid precipitation among the environmental variables, no relevant international standard yet exists to define rigorous methods and procedures for rain gauge calibration and for the evaluation of the associated uncertainty. The only existing standard in the field of rainfall measurement is at present the EN 13798:2010 "Hydrometry - Specification For a Reference Raingauge Pit". This standard addresses the construction characteristics of the so-called "pit gauge", the field reference adopted for comparison of liquid precipitation gauges, and its application is therefore limited to the design of research experiments or test beds. The recently published Technical Report CEN/TR 16469:2012 "Hydrometry - Measurement of the rainfall intensity (liquid precipitation): requirements, calibration methods and field measurements", describes recent findings in rainfall intensity (RI) measurements and related accuracy aspects, following the results and outcomes of the most recent international RI gauges intercomparison organized by the WMO. The technical report also provides informative documentation (in annexes) containing methods for laboratory calibrations, field tests and reference field measurements. Based on the technical report a new work item called "Hydrometry - Measurement of rainfall intensity (liquid precipitation) - Metrological requirements and test methods for catching type rain gauges" is now adopted by CEN TC318.</p> <p>The coverage of this standard project is limited to catching type gauges, which – due to the presence of the rain collector – can be calibrated using a known flow rate generated in the laboratory as the reference. However, non-catching type gauge are increasingly addressed and employed by national weather services, due to the lower maintenance required and unattended operation capabilities, in particular when automatic weather stations are used. Having no funnel to collect the rainwater, these measurement instruments cannot be calibrated using an equivalent, reference flow rate. Rather, the actual rain event characteristics have to be reproduced, including drop size distribution, drop frequency and fall velocities. This requires a considerable metrological effort to investigate traceability and uncertainty issues to support new</p>

	<p>calibration methods and laboratory rainfall generators.</p> <p>The current project on catching type instruments is expected to enter the public enquiry phase in 2018, and possibly become an adopted standard in 2019. At that time, a two/three year research project could reasonably fit the needs for metrological research in support of the planned standardization of non-catching type instruments.</p>
Enclosures	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are you interested in attending the STAIR EMPIR meeting of 10th October 2017 to discuss this need?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Prof. Luca G. Lanza (luca.lanza@unige.it)

*For more information, please consult:

[EMPIR website](#)

[CEN/CENELEC website "Standards and metrology"](#)