

Title: Determining new uncertainty requirements for increasingly stringent legislative HCl industrial emission limits

Abstract

HCl is acutely toxic to all forms of life, contributes to the formation of photochemical smog and increases the attrition of buildings and other infrastructure due to dissolution of minerals. Best Available Techniques (BAT) Conclusions documents adopted under the EU's Industrial Emissions Directive (IED 2010/75/EU) are bringing in emission limits for HCl that are up to 80 % lower than is currently the case. HCl measurements across Europe have been standardised in EN 1911, a mandatory documentary standard which has been passed into member state legislation. Evidence has shown that it is unrealistic to apply the existing uncertainty requirement of 30 % ($k = 2$) of the emission limit to those engaged with measuring emissions from industrial processes due to be under these new limits. Therefore, proposals in response to this SRT should determine the performance of EN 1911 at low emission levels as a function of process type so that new uncertainty requirements can be defined.

Keywords

Industrial emissions, HCl, emission limits, stack simulators, air quality, Best Available Techniques (BAT).

Background to the Metrological Challenges

The legal limit for emissions to air of HCl for many industrial processes under the Industrial Emissions Directive (IED) is 10 mg/m³, however, industry specific Best Available Techniques (BAT) Conclusions documents for some processes in the future will set limits that are as much as 80 % lower than this, e.g. large combustion plant, glass, and non-ferrous metal. There is a legal obligation for national regulators to enforce such limits as, in contrast to the seven prior directives it superseded, the EU's Industrial Emissions Directive adopts BAT Conclusions documents under Article 13(5).

In the industrial emissions sector CEN/TC 264 'Air Quality' is responsible for producing documentary standards in the emissions sector: such standards often being requested under European Commission mandates to support EU directives (e.g. the IED). Such standards are referred to as Standard Reference Methods (SRMs) as they are passed into, or referred to, in member state legislation, i.e. an SRM is mandatory and not voluntary. EN 1911 describes the SRM for HCl and hence it is this method that is used across the EU for demonstrating compliance with emission limits stipulated in the IED. EN 1911 was validated under EC mandate in the early 2000's across a series of field tests when the emissions from industrial stacks were quite different from those seen currently and when emission limits below 10 mg/m³ were far from being considered. It is from this validation data that the required measurement uncertainty of 30 % ($k = 2$) of limit value was derived.

It has become clear from evidence such as that found in emission limits of less than 10 mg/m³, it will not be possible for stack testing organisations to meet the 30 % uncertainty requirement. What is also known is that the uncertainty that is possible will vary depending on process type as there is a dependency on the overall composition of the stack emissions. There is a need to determine what uncertainties are realistic in the application of EN 1911 below 10 mg/m³, including an assessment of the effect of different emission compositions. From this it would then be possible to provide new recommended uncertainty requirements for the increasingly stringent emission limits that are / will be coming into force under various BAT Conclusions documents.

The measurement infrastructure that has been put in place to support the IED and BAT Conclusions is very much dependent on the SRM. Therefore, the Standard Reference Method should be characterised across a range of emission compositions representing different industrial processes at low levels in-line with emission limits coming into force in the future. This will provide the independent evidence base for uncertainty requirement recommendations to be documented into a reference source for national regulators.

Objectives

Proposers should address the objectives stated below, which are based on the PRT submissions. Proposers may identify amendments to the objectives or choose to address a subset of them in order to maximise the overall impact, or address budgetary or scientific / technical constraints, but the reasons for this should be clearly stated in the protocol.

The JRP shall focus on determining new uncertainty requirements for HCl industrial emission limits.

The specific objectives are

1. To develop and validate a new capability (using stationary source simulators or similar facilities) to generate low level HCl concentrations in a range of gas compositions applicable to BAT Conclusions emission limits (i.e. below 10 mg/m³) adopted under the Industrial Emissions Directive (IED 2010/75/EU).
2. To characterise the performance of the HCl Standard Reference Method (EN 1911) using the capability developed in objective 1 at low emission levels across a range of compositions representing different industrial processes. In addition, to identify and characterise new uncertainty sources that become significant only at low concentrations (i.e. lower than 10 mg/m³).
3. To produce a metrologically valid evidence base that identifies and characterises uncertainty contributions to measurements carried out in accordance with EN 1911 and from this to develop a series of recommended uncertainty requirements as a function of emission level and emission composition for regulatory monitoring.
4. To produce a guidance document summarising these recommended measurement uncertainty requirements. Also to elaborate on the route for dissemination of this document to EU DG Environment (Directorate-General for Environment), Task Force Emissions, CEN/TC 264 'Air Quality', and more broadly, to the emission community.
5. To contribute to a revision of EN 1911 by providing the data, methods, guidelines and recommendations, which are necessary for determining new uncertainty requirements for HCl industrial emission limits, to CEN/TC 264. Outputs should be in a form that can be incorporated into the standards at the earliest opportunity and communicated through a variety of media to the standards community and to end users.

The proposed research shall be justified by clear reference to the measurement needs within strategic documents published by the relevant Regulatory body or Standards Developing Organisation or by a letter signed by the convenor of the respective TC/WG. EURAMET encourages proposals that include representatives from industry, regulators and standardisation bodies actively participating in the projects. The proposal must name a “Chief Stakeholder”, not a member of the consortium, but a representative of the user community that will benefit from the proposed work. The “Chief Stakeholder” should write a letter of support explaining how their organisation will make use of the outcomes from the research, be consulted regularly by the consortium during the project to ensure that the planned outcomes are still relevant, and be prepared to report to EURAMET on the benefits they have gained from the project.

Proposers should establish the current state of the art, and explain how their proposed research goes beyond this.

EURAMET expects the average EU Contribution for the selected JRPs in this TP to be 0.6 M€, and has defined an upper limit of 0.8 M€ for this project.

EURAMET also expects the EU Contribution to the external funded partners to not exceed 30 % of the total EU Contribution across all selected projects in this TP.

Any industrial partners that will receive significant benefit from the results of the proposed project are expected to be unfunded partners.

Potential Impact

Proposals must demonstrate adequate and appropriate participation/links to the “end user” community, describing how the project partners will engage with relevant communities during the project to facilitate knowledge transfer and accelerate the uptake of project outputs. Evidence of support from the “end user” community (e.g. letters of support) is also encouraged.

You should detail how your JRP results are going to:

- Address the SRT objectives and deliver solutions to the documented needs,
- Feed into the development of urgent documentary standards through appropriate standards bodies,
- Transfer knowledge to the industrial sector.

You should detail other impacts of your proposed JRP as specified in the document “Guide 4: Writing Joint Research Projects (JRPs)”

You should also detail how your approach to realising the objectives will further the aim of EMPIR to develop a coherent approach at the European level in the field of metrology and include the best available contributions from across the metrology community. Specifically, the opportunities for:

- improvement of the efficiency of use of available resources to better meet metrological needs and to assure the traceability of national standards
- the metrology capacity of EURAMET Member States whose metrology programmes are at an early stage of development to be increased
- organisations other than NMIs and DIs to be involved in the work

Time-scale

The project should be of up to 3 years duration.