



# **INDTECH2018**

## **Innovative industries for smart growth**

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**PILLAR 3**

**Session 3.6**

**Emerging metrology needs and related research activities**

**Duncan Jarvis**

**EURAMET e.V.**

**31 October 2018**

# EURAMET's European Metrology Research Programme at a glance

**Total investment**  
**423.6 M€**

across **119** projects

Pooling expertise of

**24**

NMIs and DIs from

**46**

European countries

**23**

plus the NMIs from Australia, Brazil, Canada, China, Japan, Mexico, New Zealand, the Republic of Korea and the Russian Federation



**2 465**

articles in peer-reviewed journals

**608**

training activities



**236**

academic research groups



**228**

businesses

and **50** other organisations

**5 259**

presentations at conferences



**1 206**

contributions to

**534**

technical committees and working groups of standards organisations

**68**

contributions to draft standards and published standards

**140**

published newsletters and press releases



**260**

number of articles in trade and popular press

**840** presentations at workshops and seminars, reaching an audience of

**33 000** people



Supported the development of improved instruments and machines with projected sales of **340 M€**

European Metrology  
Research Programme  
Delivering Impact



<https://www.euramet.org/health-case-studies-diagnosis>

<https://www.euramet.org/project-hlt01>



### Better infant hearing tests

Three in every 1000 babies are born with hearing impairment, which hampers development of language skills. Rapid identification is key for early intervention, so many national health authorities have hearing testing programs for babies. However the headphones used for hearing tests are set up using ear simulators designed for larger adult ears. Tailoring these to smaller ear sizes will improve the accuracy of assessments of hearing loss in young children.

**Europe's National Measurement Institutes working together**

The European Metrology Research Programme (EMRP) brings together National Measurement Institutes in 23 countries to address key measurement challenges at a European level. It supports collaborative research to ensure that measurement science meets the future needs of industry and wider society.



17NRM03 EUCoM



### Publishable Summary for 17NRM03 EUCoM Standards for the evaluation of the uncertainty of coordinate measurements in industry

#### Overview

The project aims to deliver two methods for evaluating the uncertainty of coordinate measurement. These methods will be suitable for inclusion in international standards and applicable to common cases in industry. Correct evaluation of uncertainty during inspections is necessary to avoid false decisions such as accepting nonconforming parts. The most popular technique for dimensional inspection in industry is coordinate measurement. Recognised and viable methods for uncertainty evaluation will improve quality assurance and impact positively the European manufacturing sector.

#### Need

In the last decade, the GDP due to manufacturing grew in Europe less than the accumulated inflation (11.7 % vs. 15.7 %), with a net contraction of the European manufacturing. The key to staying competitive with low-wage developing countries is advanced manufacturing of high-quality products. This is impossible without high standards for intermediate and final inspections, primarily on dimensional and geometrical quantities (GPS – Geometrical Product Specification). It is noted that even a tiny improvement in this area would result in a very large economic impact due to the large GDP fraction of manufacturing in Europe.

Inspections provide factual evidence for decision-making. Standardised rules exist (EN ISO 14253-1, ISO/TR 14253-6) to decide upon part conformity or nonconformity with specifications (tolerances) taking account of the inevitable uncertainty incurred in measurement. Unfortunately, the evaluation of the uncertainty in coordinate measurement is technically very difficult, little guidance is available in international standards, and industry often overlooks it.

New viable and standardised methods for evaluating the uncertainty in coordinate measurement would make inspections in manufacturing more reliable, ensure better quality of products, and help maintaining and possibly strengthening the EU competitiveness on the global market.

#### Objectives

The overall objective of the project is to develop viable methods for evaluating the measurement uncertainty in coordinate measurement in industry, to support the competent standardisation body (ISO/TC213/WG10) in further development of related standards (in the ISO 15530 series).

The specific objectives of the project are:

1. To develop traceable and standardised methods for evaluating the uncertainty of coordinate measurement a posteriori using type A evaluation.
2. To develop a simplified and validated method for predicting the uncertainty of coordinate measurements a priori using type B evaluation (i.e. expert judgement).
3. To demonstrate the validity of existing methods and those from objectives 1 & 2 in industrial conditions and evaluate their consistency and accuracy against the Guide to the Expression of Uncertainty in Measurement (GUM) and its supplements.
4. To contribute to revisions of the EN ISO 15530 and the EN ISO 14253-2 by providing the necessary data, methods, guidelines and recommendations, in a form that can be incorporated into the standards at the earliest opportunity. In addition, to collaborate with the technical committees CEN/TC290 and ISO/TC213/WG10 and the users of the standards they develop to ensure that the outputs of the project

Report Status: PU Public

This publication reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains.



Publishable Summary

Issued: June 2018

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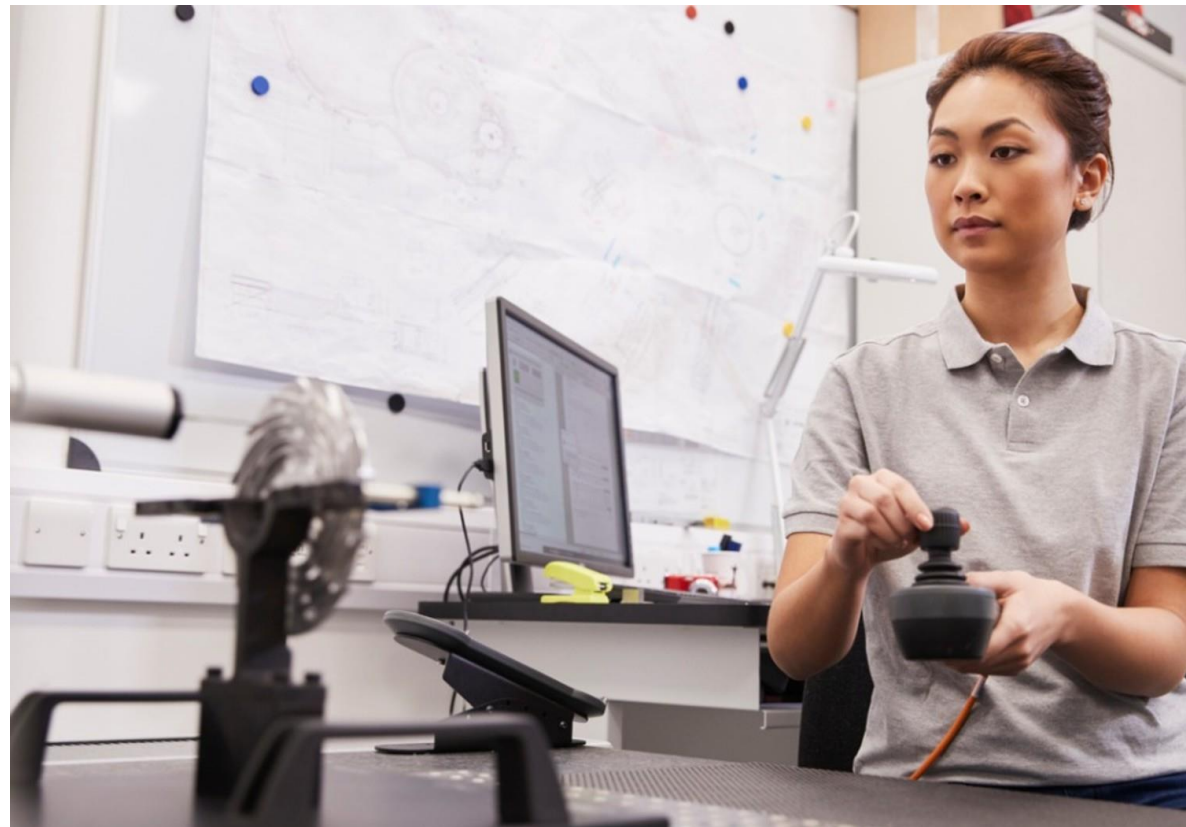
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<https://www.euramet.org/project-17nrm03>





EMPIR Call 2018 – Health, SI Broader Scope,  
Normative and Research Potential



Selected Research Topic number: **SRT-n11**  
Version: 4.0

[https://msu.euramet.org/current\\_calls/pre\\_norm\\_2018/SRTs/SRT-n11.pdf](https://msu.euramet.org/current_calls/pre_norm_2018/SRTs/SRT-n11.pdf)

**Title: Metrology for monitoring endocrine disrupting compounds under the Water Framework Directive**

**Abstract**

The Water Framework Directive (WFD) establishes a strategy for the protection and improvement of the aquatic environment and water quality in Europe. Among chemical pollutants of particular concern are endocrine disrupting compounds (EDCs) due to their environmental and public health effects. In 2013, a class of EDCs - natural and synthetic oestrogens - were introduced in the first WFD watch list of priority substances together with their possible methods of analysis and performance requirements. However, reliable harmonised methods that meet these requirements are still missing and urgently needed. Proposals are required to develop traceable measurement methods for the determination of the targeted EDCs and to ensure their transfer to normative bodies.

**Keywords**

EDC, oestrogens, estrogens, WFD, Water Directive, 2000/60/EC, 2013/39/EU, 2009/90/EC, Watch List, water quality, environment, public health, CEN/TC 230, ISO/TC 147

**Background to the Metrological Challenges**

Water is a crucial resource and to satisfy the demand for water quality, an ambitious set of European directives has been put in place under the umbrella of the WFD, Directive 2000/60/EC and its derivatives, to monitor and control the occurrence and concentrations of potentially polluting substances in the aquatic environment. Decision (EU) 2015/495 specifies a "Watch List" of priority substances pursuant to the WFD that must be monitored across Europe. Three hormones, also known as endocrine disrupting compounds (EDCs): 17- $\beta$ -oestradiol (E2), 17- $\alpha$ -ethinyloestradiol (EE2) and oestrone (E1), were selected for inclusion in this first Watch List in order to facilitate the determination of appropriate measures to address the risk posed by those substances.

The monitoring of substances in the Watch List should generate high-quality data on their concentrations in the aquatic environment. However, the European Commission has identified that there is a lack of standardised methods to monitor oestrogens that meet the requirements of the Directive and its derivatives. There are currently no methods available to guarantee the integrity of samples between sampling and analysis, nor quality control tools to ensure reliability. The detection limits specified within the WFD are 0.035 ng/L for EE2 and 0.4 ng/L for E1 and E2. However, the lowest limit of quantification (LOQ) reported in the literature for E2 and EE2 is 0.05 ng/L.

In addition, there are no CEN or ISO standards currently available to address the measurement of EDCs by conventional chemical analysis. As such, each Member State has its own methodology for national monitoring. A new mechanism is therefore required to ensure that traceable measurements of EDCs to satisfy the requirements of the WFD are possible and well defined, and to ensure that measurements across Europe are comparable.

**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 the traceable measurement and characterisation of endocrine disrupting compounds, in particular oestrogens, to support the requirements of the European Water Framework Directive 2000/60/EC

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## Future European joint metrology research should:

- Continue to address societal challenges, including the need to support economic growth
- Improve the advice given to policy makers and standardisers – particularly to support EU regulation that requires metrology
- Work more closely with regulators to anticipate their needs so the right metrology can be developed in due time
- Liaise better with other European and international players in the fields of conformity assessment, legal metrology, accreditation and standardisation to ensure that the whole system that guarantees reliable measurements works efficiently



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