



AirMonTech



AQ Monitoring Technologies: Current state and future options

R. Gehrig, C. Hüglin, Empa Dübendorf (Switzerland)
Final AirMonTech Conference; Brussels, Belgium 16 May 2013

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- Aim of WP1 (Existing Technologies for regulated compounds)
- Overview of documents
- Standardisation and quality assurance

- Information on technologies and performance of available instruments for the measurement of regulated pollutants
 - Guidance for optimal use of available instruments (measurement technologies)
 - Provide easy access to this information through AirMonTech database
- ⇒ Harmonisation of air quality measurements in Europe

Collect and write documents relevant for persons involved in air quality monitoring (network operators) ...

... and make them easily accessible in a database.

- ***External documents collected from network operators and manufacturers***
 - Type approval test reports
 - Standard operating procedures (SOP)
 - Equivalence test reports (PM2.5 and PM10 monitors)
 - Specification sheets/Application reports
 - etc.
- ***AirMonTech documents on air pollutants and measurement technologies produced by the consortium***

- *Metric Basic Information (MBI)*
Definitions, sources, health relevance, regulations, reference methods, references
- *Metric Measurement Technology Overview (MMTO)*
Table listing measurement technologies, typical operational characteristics, applicability (remote/rural/urban)
- *Metric Measurement Technology Information (MMTI)*
Details for each technology listed in the MMTO document

Model Standard operating procedure (SOPM)

Aim

Supporting network operators in setting-up or updating an SOP.

Giving example text for the necessary points which need to be addressed in an SOP.

Important

It can only serve as an extended template because an SOP needs to describe the actual circumstances of a network (site locations, exact type of an analyzer, organization and planning of the maintenance procedures etc.).

AirMonTech documents

- Produced , checked and adopted by members of the AirMonTech consortium.

External documents

- Unchanged files from source and/or authors indicated in the file.
- Short file description in database provided by the uploading AirMonTech consortium member



Document details

download
Document
<u>Code:</u> AMT9
<u>Type:</u> Standard operating procedures - Model (SOPM)
<u>Author:</u> Empa, Robert Gehrig
<u>Language:</u> English
<u>Title:</u> Model of a Standard Operating Procedure (SOP) for NO _x measurements with a chemiluminescence analyzer
<p><u>Description:</u> This model SOP aims at giving support to network operators in setting-up or updating a SOP for NO_x monitoring. It gives example text for the necessary points which need to be addressed in a SOP. However, it can only serve as an extended template because a SOP needs to describe the actual circumstances of a network (site locations, exact type of an analyzer, organization and planning of the maintenance procedures etc.). Thus, these items have to be formulated for each monitoring network individually and in a specific way.</p>
<u>Created on:</u> 20/03/2012 10.27.26
<u>Updated on:</u> 20/03/2012 10.28.16

Quality of data must be appropriate for the intended use

- Research
- Compliance measurements

Quality assurance/quality control is of crucial importance

- The AirMonTech database provides valuable information on QA/QC.
- For compliance measurements reference methods (or equivalent methods) have to be used.

▪ SO ₂	EN 14212 (2012)	UV fluorescence
▪ NO ₂ and NO	EN 14211 (2012)	Chemiluminescence
▪ O ₃	EN 14625 (2012)	UV photometry
▪ CO	EN 14626 (2012)	Non-dispersive IR spectroscopy
▪ Benzene	EN 14662;1-5 (2005)	5 chromatographic methods
▪ PAH	EN 15549 (2008)	BaP only, manual method
▪ Pb, Cd, As, Ni	EN 14902 (2005)	Analysis on PM10 filters
▪ Inorganic ions in PM	CEN/TR 16269 (2011)	Analysis on PM2.5 filters
▪ PM10	EN 12341 (1998)	Manual gravimetric method ^{*)} , ^{**)}
▪ PM2.5	EN 14907 (2005)	Manual gravimetric method ^{*)} , ^{**)}
▪ EC, OC	CEN/TR 16243 (2011)	Thermal-optical analysis on filters ^{*)}

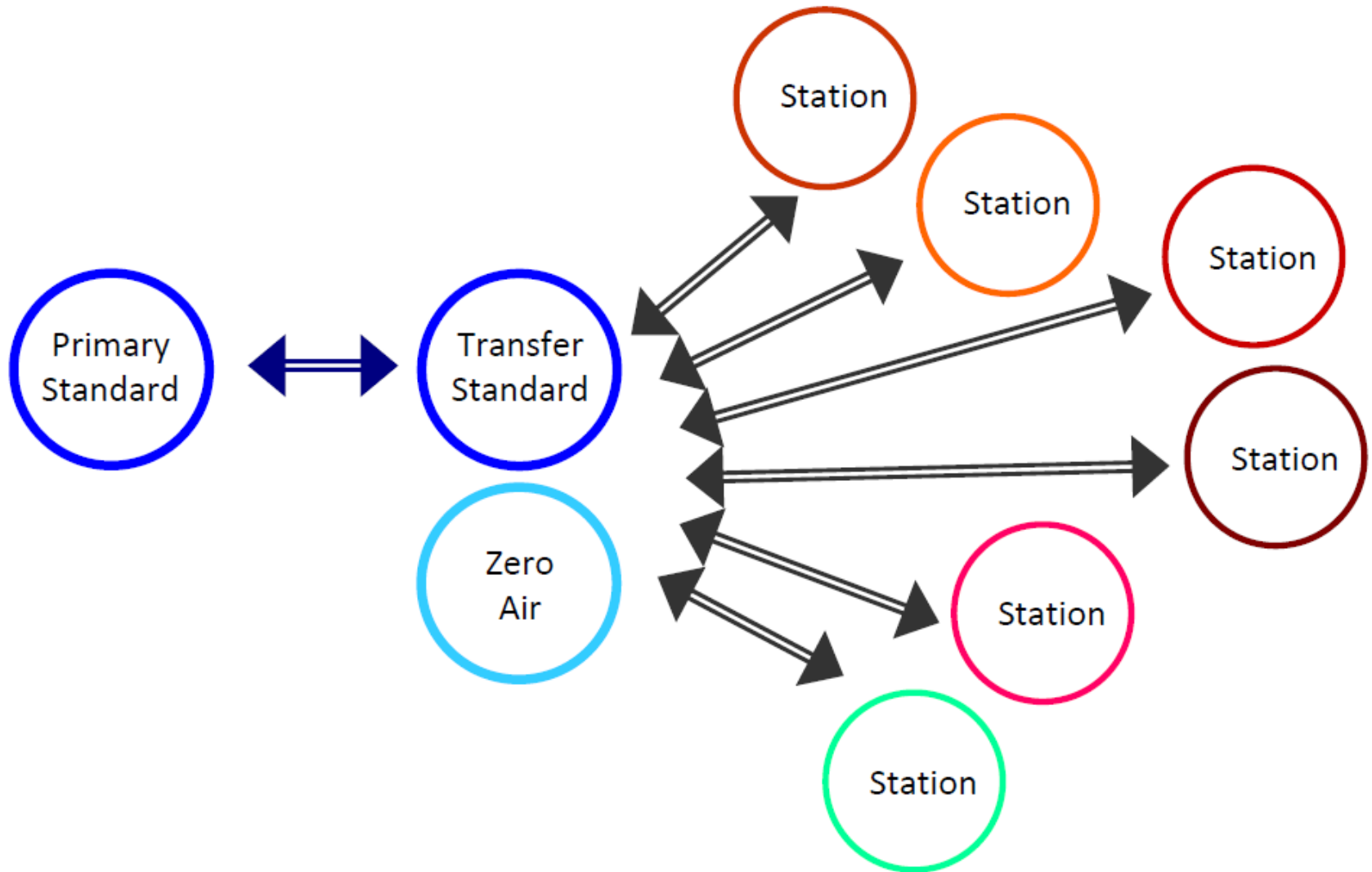
^{*)} *Conventional reference method*

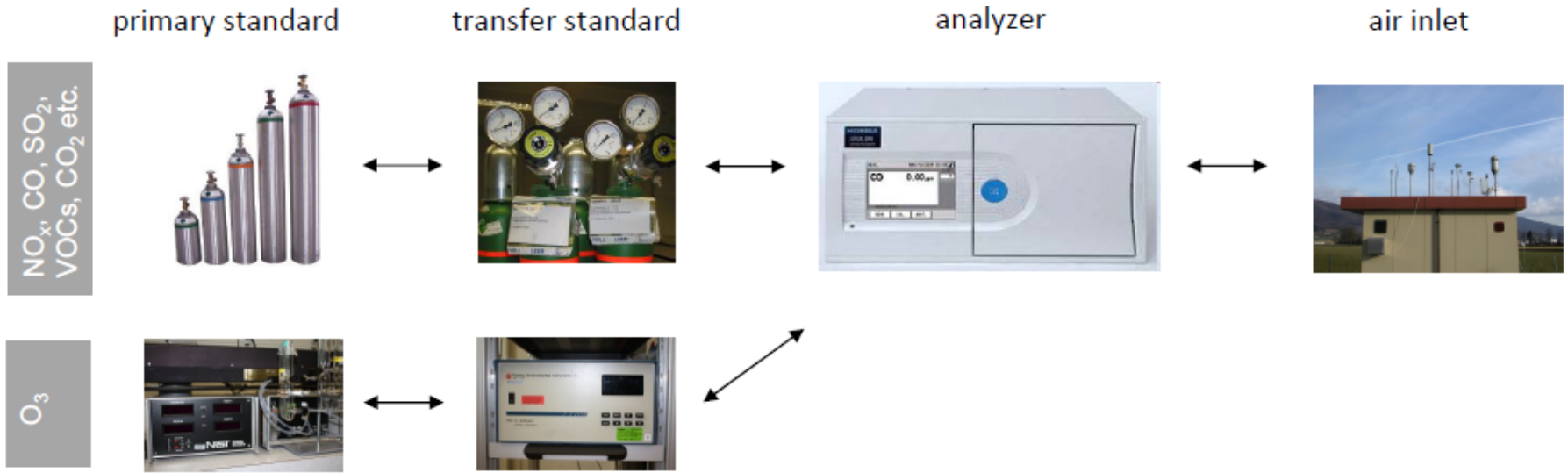
^{**)} *New combined standard for PM10 and PM2.5 under development (Draft prEN 12341;2012)*

Reference method is more than a defined measuring principle! The respective CEN standards also include:

- Performance characteristics and minimum required performance criteria for instruments
- Sampling inlets and sampling lines
- Maintenance, checks and calibrations in the field
- Determination of uncertainties
-etc.

The use of reference methods is important to assure reliability and comparability of AQ data





- uncertainty components
- primary standard
 - transfer standard
 - zero air
 - repeatability
 - noise
 - drift (zero)
 - drift (span)
 - linearity (deviation from calibration function)
 - dependence on pressure changes
 - dependence on temperature changes
 - interferences (H_2O and others)
 - sampling effects (e.g. losses)

- WP1 of AirMonTech focused on the collection and preparation of documents on regulated air pollutants.
- Approx. 200 documents on existing technologies were submitted by network operators and manufacturers and are accessible on the AirMonTech database.
- Basic documentations on current technologies were prepared by the AirMonTech consortium and are available on the database.
- Data quality matters! Important elements of QA/QC are:
 - use of reference methods
 - traceability of calibration
 - instrument and laboratory intercomparisons