



BSI Standards Publication

**Stationary source emissions - Predictive
Emission Monitoring Systems (PEMS) -
Applicability, execution and quality assurance**

National foreword

This Published Document is the UK implementation of CEN/TS 17198:2018.

The UK participation in its preparation was entrusted to Technical Committee EH/2/1, Stationary source emission.

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English Version

**Stationary source emissions - Predictive Emission
Monitoring Systems (PEMS) - Applicability, execution and
quality assurance**

Émission des sources fixes - Systèmes prédictifs
de suivi des émissions atmosphériques -
Applicabilité, mise en oeuvre et assurance qualité

Emissionen aus stationären Quellen - Systeme zur
Bestimmung von Emissionen mittels kontinuierlich
überwachter Prozessparameter (PEMS) -
Eignung, Anwendung und Qualitätssicherung

This Technical Specification (CEN/TS) was approved by CEN on 16 March 2018 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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European foreword

This document (CEN/TS 17198:2018) has been prepared by Technical Committee CEN/TC 264 "Air quality", the secretariat of which is held by DIN.

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Introduction

Predictive emission monitoring systems (PEMS) are used for continuous monitoring of emissions at stationary sources as an alternative and/or backup for automated measuring systems (AMS). PEMS define the relationship between a number of characteristic process parameters of an emission source and the corresponding emission concentration. If the characteristic process parameters are continuously monitored it is possible with a PEMS to continuously determine the emission concentration of the emission source.

PEMS are deduced using process data and, where required, emission data from the emission source. Using these data the PEMS is modelled. PEMS contains an emissions model and a sensor validation system for quality assurance of incoming process data.

PEMS are plant-specific emission monitoring systems and vary as regards to methodology and design:

- relational models (emission concentration as a function of one or more process parameters): theoretical or empirical relations that are fitted to a plant-specific emission data set;
- nonlinear statistical models, e.g. neural network models, or other multivariate regression techniques.

Where a component or process is specifically stated, the reference is provided as an example.

The range of application of PEMS is limited to plants with well-defined fuels and operating conditions, using inherent emission control systems. If multiple fuels are used all fuel variations are reflected in the emission model. Using inherent emission control systems means not having a downstream emission abatement system.

PEMS is illustrated in [Figure 1](#). It consists of:

- PEMS software, which is certified according to an EN 15267 procedure, with the exceptions stated in this Technical Specification;
- PEMS emissions model, which is documented by a QAL1 and validated by a QAL2 procedure according to EN 14181, with the exceptions stated in this Technical Specification;
- PEMS sensor validation system, which is documented by a QAL1 and validated by a QAL2 procedure according to EN 14181, with the exceptions stated in this Technical Specification.

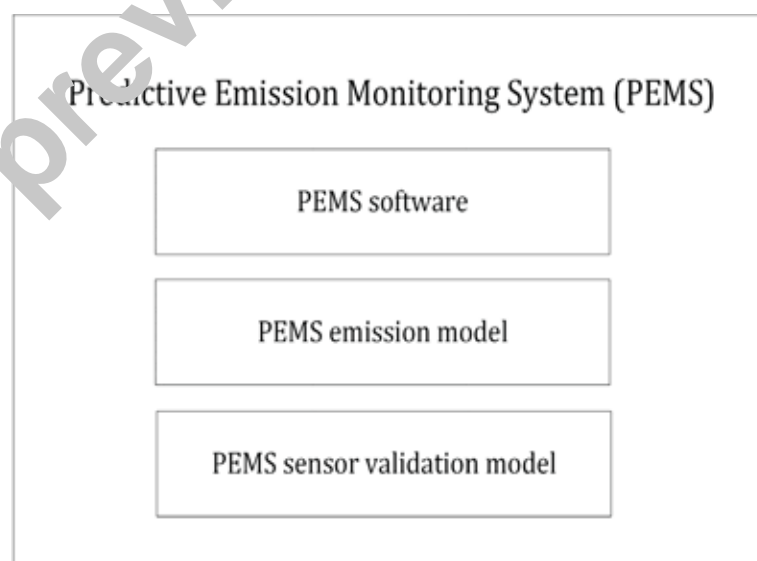


Figure 1 — Predictive emission monitoring system

PEMS software used for building, operating and quality assuring PEMS is illustrated in [Figure 2](#).

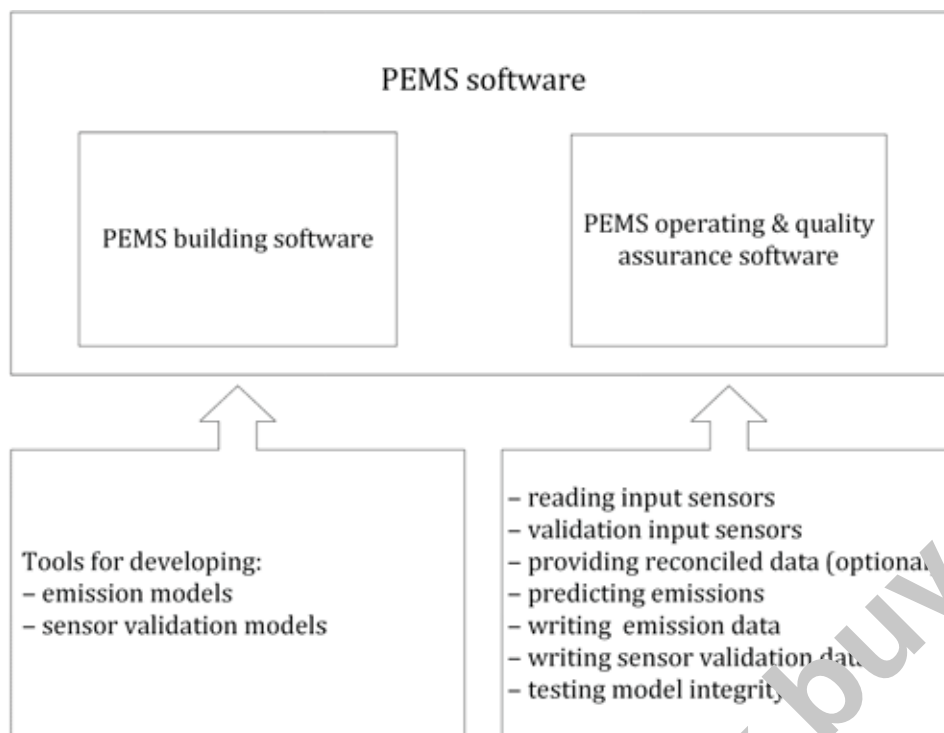


Figure 2 — PEMS software

This Technical Specification does not provide requirements for PEMS hardware. If the PEMS requires specific hardware, relevant standards for certification of PEMS hardware are used.

1 Scope

This Technical Specification gives requirements for the certification of PEMS software and for the performance and quality assurance for a PEMS to prove suitability for its measuring task and to ensure that the PEMS continues to perform within the specified performance during operation of the PEMS.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14181, *Stationary source emissions — Quality assurance of automated measuring systems*

EN 15267-1:2009, *Air quality — Certification of automated measuring systems — Part 1: General principles*

EN 15267-2:2009, *Air quality — Certification of automated measuring systems — Part 2: Initial assessment of the AMS manufacturer's quality management system and post certification surveillance for the manufacturing process*

EN 15267-3, *Air quality — Certification of automated measuring systems — Part 3: Performance criteria and test procedures for automated measuring systems for monitoring emissions from stationary sources*

CEN/TS 15675, *Air quality — Measurement of stationary source emissions — Application of EN ISO/IEC 17025:2005 to periodic measurements*

EN ISO 14956, *Air quality — Evaluation of the suitability of a measurement procedure by comparison with a required measurement uncertainty (ISO 14956)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

VDI 4201 Part 1:2010, *Performance criteria on automated measuring and electronic data evaluation systems for monitoring emissions — Digital interface — General requirements*

VDI 4201 Part 2:2014, *Performance criteria on automated measuring and electronic data evaluation systems for monitoring emissions — Digital interface — Specific requirements for Profibus*

VDI 4201 Part 3:2012, *Performance criteria on automated measuring and electronic data evaluation systems for monitoring emissions — Digital interface — Specific requirements for Modbus*

VDI 4201 Part 4:2012, *Performance criteria on automated measuring and electronic data evaluation systems for monitoring emissions — Digital interface — Specific requirements for OPC*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

IEC Electropedia: available at <http://www.electropedia.org/>

ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

automated measuring system

AMS

measuring system permanently installed on site for continuous monitoring of emissions or measurement of peripheral parameters

Note 1 to entry: An AMS is a method which is traceable to a reference method.