

**MARCOGAZ Working Group Air Emission Position
 on CEN TC 264 - WG 37 – Draft Technical Specification –
 FPr TS 17198**

*"Air quality — Predictive Emission Monitoring Systems (PEMS)
 — Applicability execution and quality assurance"*

MARCOGAZ rejects the draft CEN Technical Specification FPr TS 17198 as proposed now, because it excludes Relational Models (RM) as an accepted and proven alternative. Although the 'Relational Models (RM)' are mentioned in the scope of this draft, this document is only focusing on (promoting) one single technology Neural Networks Model (NM, Statistical Model). This is discriminatory, not acceptable for the Industry and not in the habits of CEN. MARCOGAZ insists to the insert the different efficient Models like the Relational Models (RM), important for the Industry in this CEN Technical Specification before publishing.

1. Continuous Monitoring Systems (CEMS) and PEMS (NM, RM)

1.1. Continuous Emission Monitoring System (CEMS)

Continuous sampling, analysing and auto-calibration to measure in real time concentrations of given pollutants in flue gases.

1.2. Predictive Emission Monitoring Systems (PEMS)

Prediction models for emission values derived from several measured process data.

- a) **Neural Networks Model (NM):** based on a non-linear statistical model necessitating the measurement of a significant number of data

Or

- b) **Relational Model (RM):** based on a mathematical function.

2. Proposal:

2.1. Inclusion of RM in the CEN TS

and

2.2. Adaptation of requirements for RM

A CEN TS only applicable to Neural Network Models (NM) does not answer the Industry needs and should not be published. It should include at least other proven technical

alternatives¹ as RM ensuring an acceptable level of quality in its results. Requirements for certification², calibration³ and software testing² of NM on the level of complex and sensitive CEMS have to be adapted according to technical characteristics of alternatives.

3. Rationale

The requirements of the draft CEN TS are tailored to NM PEMS, which are too complex, expensive and do not allow more cost-efficient alternatives as RM.

For RM, the requirements of the draft CEN TS would be too complex, costly and even sometimes not compatible. RM costs related to development, installation and operation are in the order of some few 10 k€ compared to NM (a black box for the end user) installation and operation costs in the order of some few 100 k€. Therefore, it is crucial for operators to have alternative models giving a better efficiency - costs/results.

4. PEMS installed at the moment

PEMS – most of them RM - are used since more than a decade by Gas Transmission System Operators in EU Member States permitted by national legislations.

RM consists mainly of proven equations based on a limited set of physical process parameters measured. The equation variables (exponents, factors ...) are set empirically after an initial measurement campaign (covering the load range to be monitored). It is sufficient to meet regulatory constraints (uncertainties of 20% of the emission limit value in the IED for NO_x).

The results are stored and reported to the authorities as they are for CEMS.

¹ Reference: Website of CEN:

"A Technical Specification (TS) is a normative document, the development of which can be envisaged when various alternatives that would not gather enough as to allow agreement on a European Standard (EN), need to coexist in anticipation of future harmonization, or for providing specifications in experimental circumstances and/or evolving technologies."

² § 5 of the draft TS / EN15267:

TSD for NM software is based on the same CEN standards (§ 5: EN15267-1, EN15267-2, EN15267-3) as CEMS. The emission model is not changing during RM operation and hence there is no need of such an expensive integrity check. It is also to be noted that, as far as we know, the PEMS software certification procedures and certification bodies do actually not exist.

³ § 7.3.4 of the draft TS is contradictory to EN14181:

§ 7.3.4 TSD excludes the use of a calibration function, of " $y = ax + b$ ", although it is allowed in EN14181, and is generally recognized as a reference methodology in metrology. That methodology is a basic of RM and is common, reliable and regularly checked (by comparison of the PEMS results with the actual flue gas concentration measurements). But § 7.3.4 only allows a " $y = x$ " calibration formula. In case of a deviation rebuilding and retesting of NM will result in days/weeks of "learning" and most probably in a costly intervention by the manufacturer.

After years of practical experience under control of authorities, it can be stated that the need for the use of a calibration of RM is low and the need to reset the initial equation is rare, so the extensive certification procedures of the different parts of NM PEMS are not necessary.

5. Actual EU Monitoring Requirements

Continuous monitoring of limited pollutants, e.g. NO_x is increasingly required by recent EU legislation for combustion plants with an integrated power above 50 MW_{th}.

It is extended:

- for e.g. Open Cycle Gas Turbines (mainly on gas compressor sites operated for natural gas transmission)
- for existing ones, less than 100 MW_{th} > 1500h/year in general to PEMS

6. Conclusion

We propose to submit a negative vote via your National Standardisation Body on the document FPr TS 17981 with the argument that this document is only promoting one single method (Neural Networks Model) with less advantages than the alternative Relational Model PEMS which gives more support to the economic activity and productivity. At least other proven methods like e.g. the Relational Model (RM), already commonly successfully used, should be included in this document before publishing this as a CEN TS.

* * * * *