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Intelligent transport systems - Urban ITS - Air quality management in urban areas

Systèmes de transport intelligents - STI-urbain - Gestion de la qualité de l'air dans les zones urbaines

Intelligente Verkehrssysteme - Urbane IVS - Luftqualitätsmanagement in urbanen Gebieten

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European foreword

This document (CEN/TS 17378:2019) has been prepared by Technical Committee CEN/TC 278 "Intelligent transport systems", the secretariat of which is held by NEN.

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Introduction

Work on Urban ITS (U-ITS) is founded in the deliverable of PT1701 published as TR 17143 [1] and on the European Commission Decision of 12.6.2016 [2] in support of Directive 2010/40/EU [9].

As cities and urban complexes expand, and there is a significant trend from rural areas to cities around the world, pollution in these urban areas becomes an ever more significant problem. Traffic - vehicle movements within the urban complex - is not the only polluter, but is considered to be a major source of pollution. Other causes are air conditioning/central heating systems, coal and wood burning heating, factories, etc.

"Air pollution has a major impact on human health. It is associated with a range of deadly diseases including cancer, heart disease, strokes and asthma, and is the number one environmental cause of death in the EU, responsible for more than 430,000 early deaths in 2012 alone." [11]

"More than one fifth of the EU urban population are exposed to air pollution which exceeds EU limit values. As of 2013, exceedances of the PM10 daily limit value were registered in 22 EU Member States, while 19 remained in breach of limits for NO2. In theory, citizens in all those countries could go to court to demand that action is taken. In reality, national rules and procedures often make it very difficult for them to do so." EU law provides citizens with some possible solutions to these difficulties, by guaranteeing them rights to certain procedures. Domestic courts are obliged to give effect to EU law, even if this involves setting aside incompatible national laws. Domestic courts must give effect to EU law rights by providing effective remedies." [12]

This document provides guidance and identifies requirements and options on how to set up a policy and how to deploy reliable and scalable technologies to monitor air quality on continuous or regular basis and to react with adequate measures. This provides a means to measure the air quality required by relevant EU directives.

The most recent directive relating to ambient (outdoor) air quality is the DIRECTIVE 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe (the "Directive"), which was adopted in 2008 [13], and requires member states to:

— **Monitor and assess** air quality to ensure that it meets these objectives;

— **Report** to the Commission and the public on the results of this monitoring and assessment;

— **Prepare and implement** air quality plans containing measures to achieve the objectives.

This specification provides a means for urban administrations to demonstrate their progress to, and achievement of, EC required air quality.

1 Scope

This document provides information, guidance and specifications of requirements and options on how to set up an air quality (emissions) management policy, and how to deploy reliable and scalable technologies to monitor air quality on a continuous or regular basis, and to react with adequate measures.

This document defines technological concepts that provide reliable and open data, and defines the functional requirements on measurement devices that produce such data. This provides a means to measure the air quality required by relevant EU directives.

This document provides information and specifications enabling to specify air quality levels for triggering a scenario.

Specifically, this specification provides a toolkit of parameters and data definitions that a regulator can use to e.g.

— define proper air quality measures, suitable for a street, zone or the whole city

— inform a driver in advance of entry to a Controlled zone about air quality level and related policy measures expected to be in operation at a given time, e.g. higher parking price per location due to the adverse air quality; and of the time windows of the measure operation of the controlled zone

— inform the relevant city departments on the introduced measure, air quality levels and number of vehicles entered.

In order to maximize European harmonization, it is recommended that this specification is used in combination with a module of standardized data concepts, i.e. an "air quality management data dictionary" (AQMDD), however, this version of this document, which is focussed on policies and procedures, does not provide these data concept specifications.

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.

CEN/TS 17380:2019[1], *Intelligent transport systems - Urban-ITS - 'Controlled Zone' management using C-ITS*

EN 12341, *Ambient air - Standard gravimetric measurement method for the determination of the PM10 or PM2,5 mass concentration of suspended particulate matter*

EN 14211, *Ambient air - Standard method for the measurement of the concentration of nitrogen dioxide and nitrogen monoxide by chemiluminescence*

EN 14662-3, *Ambient air - Standard method for the measurement of benzene concentrations - Part 3: Automated pumped sampling with in situ gas chromatography*

EN 12414, *Vehicle parking control equipment - Pay and display ticket machine - Technical and functional requirements*

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[1] Under preparation. Stage at the time of publication: FprCEN/TS 17380

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 https://www.iso.org/obp

3.1
air quality monitoring station
equipment measuring air pollution, deployed ideally as a network, based on the reference methods for air quality monitoring as generally defined in Exchange of Information Decision (EO/ 97/101/EC)

3.2
emission management
application of regulations and policies for enabling controlled access of selected classes of vehicles to defined areas, and for controlled usage of such areas e.g. parking, in order to improve air quality in a given area

Note 1 to entry: The terms "emission management" and "air quality management" are used synonymously in this document.

3.3
fuel
combustible material in solid, liquid or gaseous form, determined by its producer for combustion to release the energy content of the material

3.4
geofencing
creating of a virtual geographic boundary

3.5
hackathon
design sprint-like event in which computer programmers and others involved in software development, including graphic designers, interface designers, project managers, and others, often including subject-matter-experts, collaborate intensively on software projects with the goal to create usable software

Note 1 to entry: Also known as a hack day, hackfest or codefest.

Note 2 to entry: Hackathons tend to have a specific focus, which can include the programming language used, the operating system, an application, an API, or the subject and the demographic group of the programmers.

3.6
particulate matter
issue with particles of solid and liquid material ranging from 1nm to 100µm, which remain for some time in the air

3.7
polluting matter
issue with any pollutant which, by its presence in the air, has or may have harmful effects on human health or the environment or annoys the odour

3.8
polluting
introduction of one or more pollutants into the air

3.9
traffic burden monitoring system
system applying traffic flow information technologies and AQMSs for providing wide area monitoring of a zone regarding traffic burden and air quality levels in the resolution of a street

3.10
volatile organic compounds
any organic compound or mixture of organic compounds, with the exception of methane having a vapour pressure of 0,01 kPa or more at 20 °C or a corresponding volatility under specific conditions of use

4 Symbols and abbreviations

AQMDD	air quality management data dictionary
AQMS	air quality monitoring station
BRT	bus rapid transit
CAMe	Comisión Ambiental de la Megalópolis
	English: Environmental Commission for the Megalópolis
FUA	functional urban area
ITS	intelligent transport systems
LEZ	low emission zone
NO	nitric oxide
NO2	nitrogen dioxide
NOx	nitrogen oxides
OBD	On-board diagnostic
P+B	park and bike
P+G	park and go
P+R	park and ride
PM	particulate matter
PM10	solid particles with aerodynamic diameter less than 10 μm
PM2.5	solid particles with aerodynamic diameter less than 2,5 μm
SUMP	sustainable urban mobility plan
VOC	volatile organic compounds
WHO	World Health Organization