BS EN 16980-1:2021

BSI Standards Publication

Photocatalysis — Continuous flow test methods

Part 1: Determination of the degradation of nitric oxide (NO) in the air by photocatalytic materials

bsi.

National foreword

This British Standard is the UK implementation of EN 16980-1:2021. It supersedes PD CEN/TS 16980-1:2016, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RPI/13, Advanced technical ceramics.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Supersedes CEN/TS 16980-1:2016

English Version

Photocatalysis - Continuous flow test methods - Part 1: Determination of the degradation of nitric oxide (NO) in the air by photocatalytic materials

Photocatylyse - Méthode d'essai en flux continu - Partie 1 : Détermination de la dégradation du monoxyde d'azote (NO) dans l'air par des matériaux photocatalytiques

Photokatalyse - Prüfverfahren mit kontinuierlichem Durchfluss - Teil 1: Bestimmung des Abbaus von Stickstoffmonoxid (NO) aus der Luft durch photokatalytische Werkstoffe

This European Standard was approved by CEN on 9 May 2021.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 16980-1:2021) has been prepared by Technical Committee CEN/TC 386 "Photocatalysis", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2022, and conflicting national standards shall be withdrawn at the latest by March 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 16980-1:2016.

EN 16980-1:2021 includes the following significant technical changes with respect to CEN/TS 16980-1:2016:

— 3.2

  — addition of: "A sample illuminated surface area in m^2"

  — deletion of: "CIN concentration at reactor inlet" and "Fv,I fan flow at ith potential"

  — modification of abbreviations: "F Flow" to "Q Flow", "V0" to "U_0", "Vmin" to "U_{min}", "MM" to "M"

— 6.3 (before 6.2) Modification of Figure 2

— 7.1 updated sentence: "Samples shall be eventually preconditioned following the supplier advices."

— 8.1 updated formula: $C\left(\mu g\ m^{-3}\right) = 10^3 \frac{C\left(ppmv\right) \times M \times P}{R \times T} = ppmv \times k$

— 12 (before 11):

  — addition of: "a) international Standard used (including its year of publication)";

    "b) any deviations from the procedure";

    "c) the date of the test";

— Annex A: change of figure "Typical trend of NO, NO_2 and NO_x concentrations during a photocatalytic test at nominal fan speed"

— Annex B: change of figure "Typical trend of NO, NO_2 and NO_x concentrations during a photocatalytic test at nominal fan speed".

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document specifies a method for assessing the performance of photocatalytic inorganic materials contained in cement mortars and/or limes or ceramic-based matrices, paints or materials deposited as thin films or coatings on a variety of substrates for the photocatalytic abatement of nitric oxide in the gas phase. This method does not apply to the assessment of samples to be applied with flow perpendicular to the surface or flow permeating the surface itself as polymeric and paper filters, honeycomb structures and suchlike.

The performance for the photocatalytic sample under test is evaluated by measuring the degradation rate of nitric oxide (NO) using the method specified herein. The photocatalytic abatement rate is calculated from the observed rate by eliminating the effects of mass transfer. The intrinsic photocatalytic abatement rate is an intrinsic property of the material tested and makes it possible to distinguish the photocatalytic activities of various products with an absolute scale defined with physical and engineering meaning.

For the measurements and calculations described in this document the concentration of nitrogen oxides (NO_X) is defined as the stoichiometric sum of nitric oxide (NO) and nitrogen dioxide (NO_2).

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 16599, *Photocatalysis — Irradiation conditions for testing photocatalytic properties of semiconducting materials and the measurement of these conditions*

EN ISO 9169, *Air quality — Definition and determination of performance characteristics of an automatic measuring system (ISO 9169)*

ISO 7996:1985, *Ambient air — Determination of the mass concentration of nitrogen oxides — Chemiluminescence method*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1.1
concentration of nitrogen oxides
NO_X
stoichiometric sum of nitric oxide (NO) and nitrogen dioxide (NO_2)

Note 1 to entry: For grade 999 nitrogen or air, the purity of the gas should be equal at least to 99,9 %.