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Sweepers - Part 3: Efficiency of particulate matter collection - Testing and Evaluation

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English Version

Sweepers - Part 3: Efficiency of particulate matter collection - Testing and Evaluation

Balayeuses - Partie 3: Efficacité de la collecte des matières particulaires - Essai et évaluation

Kehrmaschinen - Teil 3: Aufnahmefähigkeit von Feinstaub - Prüfung und Bewertung

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

Foreword

This document (EN 15429-3:2015) has been prepared by Technical Committee CEN/TC 337 “Road operation equipment and products”, 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of an identical text or by endorsement, at the latest by September 2015, and conflicting national standards shall be withdrawn at the latest by September 2015.

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

This document (EN 15429-3:2015) is part of a series of documents made up of the following parts:

— EN 15429-1, *Sweepers — Part 1: Classification and Terminology*;

— EN 15429-2, *Sweepers — Part 2: Performance requirements and test methods*;

— EN 15429-3, *Sweepers — Part 3: Efficiency of particulate matter collection — Testing and Evaluation*;

— EN 15429-4, *Sweepers — Part 4: Symbols for operator controls and other displays*.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Road sweepers are designed to clean transportation surfaces of varying textures. These surfaces exist in many forms, including roadways, sidewalks, and parking lots throughout urban and rural areas. Different size fractions of debris, dirt, and fine dust that originate from various sources accumulate on these surfaces. Fine road dust components, including particulate matter classified as PM_{10} and $PM_{2,5}$, are of particular interest due to the respiratory health hazards that have been associated with these fine particulates.

The European air quality directive requires municipalities throughout Europe to monitor airborne particulate levels, and initiate action plans when prescribed limits are exceeded. Since transportation surfaces are significant accumulators of fine particulate, regular sweeping of these surfaces has been identified as a method that can potentially reduce particulate matter pollution.

Different road sweeper technologies and configurations are available for various sweeping applications. However, the ability of the different technologies and configurations to remove and capture particulate matter from the road surface, and minimize the level of airborne particulates resulting from sweeping, has not been thoroughly evaluated for adequate technical information on this issue to be available. As a result, municipalities may have difficulty selecting a sweeper best suited to a particular sweeping application when making purchasing decisions.

The test method for determining PM_{10} and $PM_{2,5}$ efficiency of road sweepers has been developed to provide an objective and quantitative procedure for assessing the ability of a road sweeper to remove fine particulate from typical paved asphalt surfaces and to reduce the amount of airborne fine particulate generated as a result of the sweeping process.

1 Scope

This European Standard establishes a method to assess the PM_{10} and $PM_{2,5}$ efficiency of road sweepers. PM_{10} and $PM_{2,5}$ efficiency includes a sweeper's ability to:

— Remove and capture PM_{10} and $PM_{2,5}$ particulate matter, and coarse size fractions, from typical urban road surfaces;

— Minimize the amount of airborne and entrained PM_{10} and $PM_{2,5}$ particulate matter resulting from the sweeping process.

The sweeper's ability to remove and capture particulate matter and coarse size fractions is assessed using procedures and equipment to determine the amount of a test material (consisting of particulate matter and coarser size fractions) the sweeper is able to remove from a test surface during a controlled test run. This test measurement is used to calculate the removal efficiency for the sweeper.

The sweeper's ability to minimize the amount of airborne and entrained particulate matter is also assessed using procedures and equipment to determine the airborne concentrations of PM_{10} and $PM_{2,5}$ resulting from the sweeping of a test material (consisting of particulate matter and coarser size fractions) during a controlled test run. The test measurements are used to calculate PM_{10} and $PM_{2,5}$ emission ratings for the sweeper.

This test allows the use of dust suppression water. Sweepers configured as flushing machines, or equipped with front-mounted spray bars which are not part of a dust suppression water system are not within the scope of this test.

The road sweeper's performance results are reported in a quantitative numerical format that will allow comparative assessments of similarly classified sweepers. This test does not specify pass/fail criteria for the PM_{10} and $PM_{2,5}$ efficiency measurements specified in the test procedure.

This test is applicable to truck mounted, self-propelled, towed and attached sweeping equipment as defined in EN 15429-1:2007, Clause 2.

This test is a model/type test, requiring the sweeper being tested to be representative of all factory production of that particular sweeper model.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

EN 15429-1:2007, *Sweepers — Part 1: Classification and Terminology*

EN 60335-2-69, *Household and similar electrical appliances — Safety — Part 2-69: Particular requirements for wet and dry vacuums, including power brush, for industrial and commercial use (IEC 60335-2-69)*