

SLOVENSKI STANDARD

SIST EN 15590:2011

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Nadomešča:

SIST-TS CEN/TS 15590:2007

Trdna alternativna goriva - Ugotavljanje potencialne stopnje mikrobiološkega lastnega segrevanja z uporabo realnega dinamičnega respiratornega indeksa

Solid recovered fuels - Determination of potential rate of microbial self heating using the real dynamic respiration index

Feste Sekundärbrennstoffe - Bestimmung des potenziellen Grades der mikrobiellen Selbsterhitzung mittels des realen dynamischen Respirationsindexes

Combustibles solides de récupération - Détermination du taux d'activité microbienne utilisant l'index de respiration dynamique

Ta slovenski standard je istoveten z: EN 15590:2011

ICS:

75.160.10 Trda goriva

Solid fuels

SIST EN 15590:2011

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EUROPEAN STANDARD

EN 15590

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2011

ICS 75.160.10

Supersedes CEN/TS 15590:2007

English Version

Solid recovered fuels - Determination of the current rate of aerobic microbial activity using the real dynamic respiration index

Combustibles solides de récupération - Détermination du taux d'activité microbienne utilisant l'indice de respiration dynamique

Feste Sekundärbrennstoffe - Bestimmung des aktuellen Grades aerober mikrobieller Aktivität mittels des realen dynamischen Respirationsindex

This European Standard was approved by CEN on 15 July 2011.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 15590:2011) has been prepared by Technical Committee CEN/TC 343 “Solid recovered fuels”, the secretariat of which is held by SFS.

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 2012, and conflicting national standards shall be withdrawn at the latest by March 2012.

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 supersedes CEN/TS 15590:2007.

The following changes have been introduced:

- title and scope change; potential microbial self-heating is revised by current rate of aerobic microbial activity;
- results of inter-laboratory tests supplemented as an informative Annex C.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

This document specifies the method used for the determining the current rate of aerobic microbial activity of SRF using the real dynamic respirator index.

The current rate of aerobic microbial activity measures the biological stability under the actual chemical and physical properties of the SRF. The biological stability determines the extent to which readily biodegradable organic matter has decomposed. Therefore, the *RDR* identifies the actual point reached in the decomposition process and represents a gradation on a recognised scale of values.

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1 Scope

This European Standard specifies a method to determine the current rate of aerobic microbial activity of a solid recovered fuel. The methods indirectly estimate the potentiality of odours production, vectors attraction etc. The current rate of biodegradation can be expressed in milligrams $O_2 \text{ kg}^{-1} \text{ dm h}^{-1}$.

WARNING — SRF can contain potentially pathogenic organisms. Take appropriate precautions when handling them and those whose properties are unknown.

2 Normative references

The following referenced documents are indispensable for the application 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 15357:2011, *Solid recovered fuels — Terminology, definitions and descriptions*

EN 15443, *Solid recovered fuels — Methods for the preparation of the laboratory sample*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15357:2011 and the following apply.

3.1

easily biodegradable organic compounds

organic substances available for decomposition by micro-organisms within a real dynamic respiration test

3.2

hourly real dynamic respiration index

value of respiration index calculated every hour

3.3

lag or latency phase

interval of time required for the microbial flora to acclimatize during the course of the real dynamic respirometric test

3.4

mean particle size

aperture size of the sieve used for determining the particle size distribution of solid recovered fuels through which at least 50% by mass of the material passes

3.5

respiration index

rate of oxygen uptake expressed as milligram oxygen per kilogram total dry matter (dm) per hour

3.6

real dynamic respiration test

test measuring the respiration index under specific conditions including forced air flow

3.7

real dynamic respiration index

RDRI

average value of the respiration indexes representing 24 h showing the highest aerobic microbial activity

NOTE See Figure A.1.

4 Symbols and abbreviations

This European Standard uses the following symbols and abbreviations:

RDRI Real Dynamic Respiration Index

RDRI_h hourly Real Dynamic Respiration Index

d_m dry matter in kg

5 Principle

The method for determining the current rate of aerobic microbial activity specified in this European Standard is based on measuring the oxygen uptake rate by micro-organisms to biodegrade easily degradable organic matter of the sample itself under defined continuous airflow and adiabatic conditions.

The test involves keeping the sample under observation in the respirometer (dynamic test system) for 1 day to 4 days according to the duration of the lag phase (if present), taking the index value at hourly intervals (*RDRI_h*) (Clause 8). Moreover, if at the end of the fourth day, the *RDRI* trend is constant or growing, the respirometric test is prolonged with the acquisition of at least others 24 values (*RDRI_h*) (see Figure A.1).

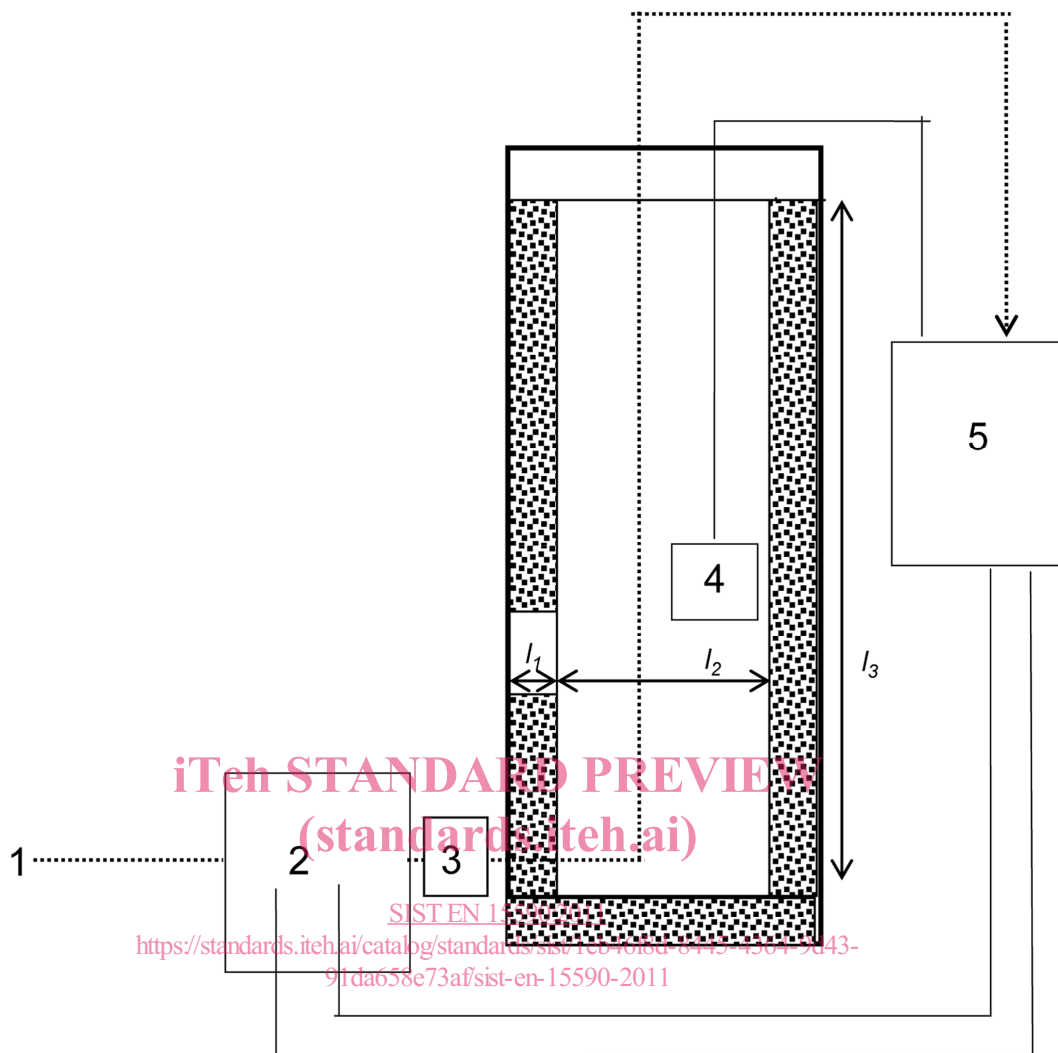
6 Apparatus

The apparatus consists of:

6.1 Dessicator.

6.2 Continuous flow aerobic respirometer, composed of (see Figure 1):

- hermetically sealed adiabatic reactor with the minimum operating volume expressed in litres, equal to or less than the average sample size expressed in millimeters and not greater than 30 mm (for example, for a sample of average size less than 10 mm, the reactor volume is 10 l); the reactor structure must force the input air to cross the entire sample before leaving the reactor, avoiding mixing the of input air and exhaust air;
- reactor air-tightness verification system;
- aeration system provided with flow regulator and capacity gauge;
- system for sampling oxygen concentration in exhaust air (% v/v);
- system of data acquisition continuously memorizing the measured parameters at 1 h intervals; the data memorized must be the average of all values read (at least 60) during the interval considered.



Key

- 1 air flow
- 2 air pump and probe for measuring of the temperature of the air inlet
- 3 flow adjustment and flow meter ($0-200 \text{ l h}^{-1}$)
- 4 probe for measuring of the temperature of the SRF
- 5 oxygen analyser and control and evaluation equipment
- l_1 thickness of the external walls of the reactor¹⁾ ($70 \text{ mm} \pm 5 \text{ mm}$)
- l_2 internal diameter of reactor
- l_3 internal height of reactor
- l_3/l_2 $1,344 \pm 0,002$

¹⁾ An insulating materials shall be employed (i.e Polypropylene).

Figure 1 — Diagram of the continuous flow aerobic respirometer

7 Procedure

7.1 Step 1 – Procedure sample preparation (if required).

The size reduction procedure shall be done following EN 15443.