



SLOVENSKI STANDARD SIST-TS CEN/TS 15590:2007

01-junij-2007

Uvod

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 Selbstererhitzung mittels des realen dynamischen Respirationindex

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

<https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007>

Ta slovenski standard je istoveten z: **CEN/TS 15590:2007**

ICS:

75.160.10 Trda goriva Solid fuels

SIST-TS CEN/TS 15590:2007 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST-TS CEN/TS 15590:2007

<https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007>

ICS 75.160.10

English Version

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

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

Feste Sekundärbrennstoffe - Bestimmung des potenziellen Grades der mikrobiellen Selbstererhitzung mittels des realen dynamischen Respirationsindex

This Technical Specification (CEN/TS) was approved by CEN on 1 January 2007 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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 United Kingdom.

[SIST-TS CEN/TS 15590:2007](https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007)

<https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Page

Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Symbols and abbreviations	6
5 Principle.....	6
6 Apparatus	6
7 Procedure	8
8 Calculation of the RDRI results	8
9 Test reports	9
Annex A (informative) RDRI trend.....	11
Annex B (normative) RDRI interpretation	13
Bibliography	14

[SIST-TS CEN/TS 15590:2007
https://standards.itech.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007](https://standards.itech.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007)

Foreword

This document (CEN/TS 15590:2007) has been prepared by Technical Committee CEN/TC 343 “Solid Recovered Fuels”, the secretariat of which is held by SFS.

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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, 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 United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST-TS CEN/TS 15590:2007](https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007)

<https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007>

Introduction

This document specifies the method used for determining the current rate of potential microbial self-heating of SRF using the real dynamic respiration index.

Spontaneous combustion can occur when SRF from municipal solid waste or biomasses are stored and/or transported. The microbial activity, because of aerobic degradation of easily degradable organic matter, acts as a primer causing the waste temperature to increase until autoxidation and the self-combustion processes takes place.

The potential self-heating of SRF can be indirectly measured by the real dynamic respiration index (RDRI), which determines the extent to which easily biodegradable organic matter of a SRF has decomposed. Therefore, the RDRI identifies the actual point reached in the decomposition process and represents a gradation on a recognized scale of values, which thus enables a comparison of potential self-heating.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST-TS CEN/TS 15590:2007](https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007)
<https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007>

1 Scope

This Technical Specification specifies a method to determine the current rate of potential microbial self-heating of a solid recovered fuel. The methods indirectly estimate the potential risk of microbial self-heating, odour production, vector attraction etc. The current rate of biodegradation can be expressed in milligrams O₂ kg TDS⁻¹ h⁻¹.

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.

CEN/TS 15357:2006, *Solid recovered fuels — Terminology, definitions and descriptions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN/TS 15357:2006 and the following apply.

3.1

current rate of potential microbial self-heating

measure of the metabolic activity of aerobic micro-organisms expressed as the rate of oxygen uptake

3.2

respiration index

rate of oxygen uptake expressed as milligram oxygen per kilogram total dry solids (TDS) per hour

3.3

real dynamic respiration test

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

3.4

real dynamic respiration index

RDRI

average value of the respiration indexes representing 24 h showing the highest aerobic microbial activity (see Figure A.1)

3.5

lag or latency phase

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

3.6

total dry solids

TDS

solid fraction of a sample that does not evaporate following the determination of the humidity (dry at 105 °C to a constant weight)

3.7

easily biodegradable organic compounds

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

3.8 self-heating condition
increase in the temperature of a SRF sample due to the heat generated by aerobic metabolism and/or auto-oxidation processes

4 Symbols and abbreviations

This Technical Specification uses the following symbols and abbreviations:

RDRI Real Dynamic Respiration Index

TDS total dry solids in kg

%TDS_v percent values of total dry solids

SRF solid recovered fuel

5 Principle

The method for determining the current rate of aerobic microbial activity specified in this Technical Specification 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 self-heating conditions.

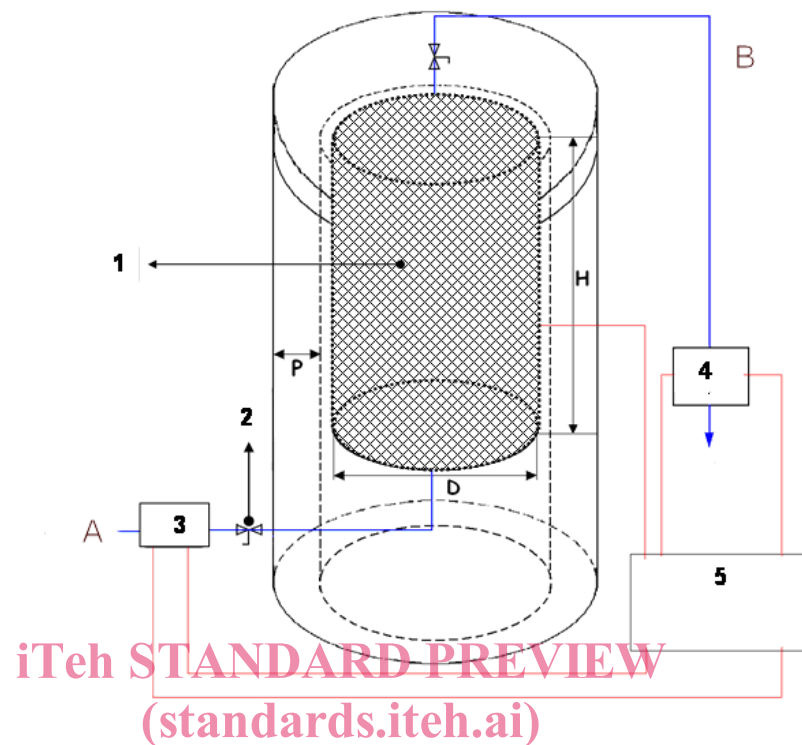
iTeh STANDARD PREVIEW
(standards.iteh.ai)

6 Apparatus

- Dessicator; [SIST-TS CEN/TS 15590:2007](https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-99ab04c73424/sist-ts-cen-ts-15590-2007)
- Muffle furnace capable of maintaining 550°C; <https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-99ab04c73424/sist-ts-cen-ts-15590-2007>
- Crucibles made of porcelain measuring a diameter of 15 mm and a height of 80 mm;
- Continuous flow aerobic respirometer:

The continuous flow aerobic respirometer is 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**

SIST-TS CEN/TS 15590:2007

<https://standards.iteh.ai/catalog/standards/sist/7314fa4a-3c0b-485d-966b-09abb4e73424/sist-ts-cen-ts-15590-2007>

- 1 SRF container:
- D* internal diameter of reactor
- H* internal height of reactor
- H/D $1,465 \pm 0,080$
- P* thickness of the external walls of the reactor = $70 \text{ mm} \pm 5 \text{ mm}$



valve used to check the reactor air-tightness system

- 2 flow adjustment and flow meter
- 3 air pump and probe for measuring of the temperature of the air inlet
- 4 oxygen analyzer
- 5 control and evaluation equipment
- A Air inlet
- B Air outlet

Figure 1 — Diagram of the continuous flow aerobic respirometer