

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 Respirationsindexes

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## 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

## 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.

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## 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.

## 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  $O_2$  kg TDS<sup>-1</sup> h<sup>-1</sup>.

## 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