ISO 19703:2018 (E)

Generation and analysis of toxic gases in fire — Calculation of species yields, equivalence ratios and combustion efficiency in experimental fires

Contents

Foreword

Introduction

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 Symbols and units
- 5 Appropriate input data required for calculations
 - 5.1 Data handling
 - 5.1.1 Uncertainty
 - 5.1.2 Significant figures and rounding off
 - 5.2 Test specimen information
 - 5.2.1 Composition
 - 5.2.2 Net heat of combustion
 - 5.3 Fire conditions
 - 5.3.1 Apparatus
 - 5.3.2 Set-up procedure
 - 5.4 Data collection
 - 5.4.1 Data acquisition
 - 5.4.2 Measured data and observations
- 6 Calculation of yields of fire gases and smoke, stoichiometric oxygen-to-fuel mass ratio and recovery of key elements
 - 6.1 Calculation of measured yields from fire gas concentration data
 - 6.2 Calculation of notional gas yields
 - 6.2.1 General
 - 6.2.2 From the elemental composition
 - 6.2.3 From the empirical formula
 - 6.3 Calculation of recovery of elements in key products
 - 6.4 Calculation of stoichiometric oxygen-to-fuel mass ratio
 - 6.4.1 General
 - 6.4.2 From the chemical equation for complete combustion
 - 6.4.2.1 For fuels containing C, H, O, for complete combustion to carbon dioxide and water
 - 6.4.2.2 For fuels containing hetero-elements
 - 6.4.3 From the net heat of combustion, ΔHc
 - 6.4.4 From the carbon content of the material
 - 6.5 Calculation of smoke yields
 - 6.5.1 General
 - 6.5.2 Smoke yields based on mass of smoke particulates
 - 6.5.3 Smoke yields based on light obscuring properties
 - 6.5.4 Relationship between mass measurement and light obscuration
 - Calculation of equivalence ratio
 - 7.1 General

7

- 7.2 Derivation of φ for flow-through, steady-state experimental systems
- 7.3 Derivation of ϕ for flow-through, calorimeter experimental systems
- 7.4 Derivation of ϕ for closed chamber systems
- 7.5 Derivation of ϕ in room fire tests

- 8 Calculation of combustion efficiency
 - 8.1 General
 - 8.2 Heat release efficiency
 - 8.3 Oxygen consumption efficiency
 - 8.3.1 General
 - 8.3.2 Oxygen depletion method
 - Oxygen-in-products method 8.3.3
 - General 8.3.3.1
 - 8.3.3.2
 - Oxygen in CO2, CO and H2O (wO,gases) Contribution from oxygen in polymer (wOex,poly) 8.3.3.3
 - 8.4 Oxides of carbon method

Page count: 33