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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Estimation of the lethal toxic potency of fire effluents

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Table of Contents

Foreword

Introduction

1 Scope

2 Normative references

3 terms and definitions

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the redrafting method to modify and adopt ISO 13344..2015 "Evaluation of Fire Smoke Fatal Toxicity", and combines the latest from

Related research results. A list of comparisons between this standard and ISO 13344..2015 chapter numbers is provided in Appendix A.

There are technical differences between this standard and ISO 13344..2015, and the terms related to these differences have been passed on the outer margins

The installed vertical single line (|) is marked, and a list of corresponding technical differences and their causes is given in Appendix B.

For ease of use, this standard also makes the following editorial changes to ISO 13344..2015.

--- Removed references to international standards and redrafted references;

--- Added Appendix A (informative appendix) and Appendix B (informative appendix), giving the chapter number and international standard chapters of this standard

The comparison of numbers and technical differences and their explanations will change Appendix A of the International Standard to Appendix C of this standard.

This standard was proposed by the Ministry of Emergency Management of the People's Republic of China.

This standard is under the jurisdiction of the National Fire Standardization Technical Committee (SAC/TC113).

This standard was drafted. Sichuan Fire Research Institute of Emergency Management, Fire Rescue Bureau of Emergency Management, Beijing Fire Rescue Corps, Yunnan Provincial Fire Rescue Corps.

Introduction

This standard establishes a standard assessment method for the lethal effects of fire smoke toxicity, which can be used when pyrolyzing or burning materials, products and components.

The toxicity of the generated flue gas is evaluated, and it is applicable to the relevant calculations in the fire safety assessment.

The threat of fire smoke to people is mainly divided into several types. death, loss of the ability to escape autonomously, reduced ability to escape, and long-term physiological effects.

The impact of fire smoke toxicity on personnel is related to the location of the person, the concentration of the smoke and the exposure time, and the fire smoke can be established based on the test results

Gas toxicity is a function of smoke concentration and exposure time.

This standard calculates the effective dose fraction (FED) and the LC50 predicted value based on the test results of the concentrations of toxic components.

Assess the lethal effects of fire smoke toxicity. According to the combustion of carbon monoxide (CO), carbon dioxide (CO₂), oxygen (O₂), cyanide

Hydrogen chloride (HCN), hydrogen chloride (HCl), hydrogen bromide (HBr), hydrogen fluoride (HF), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), acrolein

(C₃H₄O) and formaldehyde (CH₂O) and other toxic component concentrations were calculated to obtain relevant parameters for the lethal effect of fire smoke toxicity. when

When using FED parameters to evaluate toxic lethal effects, the toxic components involved in the calculation need to be indicated.

Assessment of lethal toxicity from fire smoke

1 Scope

This standard specifies the assessment methods for lethal toxicity of fire smoke, including principles, test devices, test methods, calculations and evaluation reports.

This standard applies to the lethal effects of acute toxicity of fire smoke from the combustion of materials, products and components under controlled test conditions.

Evaluation does not apply to long-term chronic toxicity assessment after exposure.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this article

Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 5907.1-2014 fire vocabulary part 1. general terms

GB/T 38309-2019 Guidelines for FTIR analysis of toxic components of fire smoke gas streams

(ISO 19702..2015, MOD)

ISO 19701 Methods for Sampling and Analysis of Fire Smoke (Methods for sampling and analysis of fire effluents)

ISO 19706 Fire Threat Assessment Guide (Guidelines for assessing the fire threat to people)

3 terms and definitions

The terms and definitions defined in GB/T 5907.1-2014 and the following apply to this document.

3.1

Carboxyhaemoglobin saturation

The carbon monoxide inhaled by the human body combines with hemoglobin in the blood to form the percentage of total hemoglobin.

3.2

Time-concentration curve

Flue gas component concentration as a function of time.

3.3

Exposure dose exposure dose

The product of the exposure time and the measured concentration of the smoke component can be calculated by integrating the area on the time-concentration curve.

3.4

Effective exposure dose effective exposure dose

The specific exposure dose required to produce a certain toxic effect.

3.5

Fractional effective dose; FED

The ratio of the exposure dose of the toxic components of the smoke to the effective exposure dose.

Note 1. FED conceptually reflects the consequences such as loss of escape ability and death caused by toxic components in smoke.

Note 2. FED based on loss of escape capability is defined as IFED.

3.6

Lethalfractional effective dose

LFED