ISO 21524:2021 (E)

Fire resistance tests — Elements of building construction — Requirements for active fire curtains

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Symbols

5 Requirements

5.1 General
5.2 Side retention
5.3 Additional requirements for multiple active fire curtains
5.3.1 Multiple active fire curtains
5.3.2 Required overlap
5.3.3 Larger than tested
5.4 Horizontal or angled
5.5 Pass door(s)
5.6 Vision panels

6 Sampling

6.1 Test samples, testing and conformance criteria

7 Test methods

7.1 General
7.2 Durability and force gauge
7.3 Reliability and durability
7.4 Deployment
7.4.1 Response time and velocity
7.4.2 Delayed and/or multi-positional deployment
7.4.3 Emergency egress control
7.4.4 Emergency access control
7.5 Smoke leakage
7.5.1 General
7.5.2 Total smoke leakage of active fire curtains with smoke-resistance
7.6 Fire resistance
7.6.1 General
7.6.2 Integrity
7.6.3 Insulation
7.6.4 Radiation (heat flux)
7.6.5 Deflection zone
7.6.6 Initial deployment
7.6.7 Operation following initial deployment — emergency egress
7.6.8 Operation following initial deployment — emergency access
7.6.9 Delayed and/or multi-positional deployment
7.7 Reaction to fire
7.8 Ancillary devices
7.8.1 General
7.8.2 Ancillary devices activation
7.8.3 Hold-open devices

7.8.4 Fire detection and alarm systems
7.8.5 Sensory equipment for obstruction warning
7.8.6 Pressure-sensitive protective equipment (PSPE)
7.8.7 Self-test facility for dwellings

8 Marking, labelling and packaging

Annex A (normative) General requirements for testing

A.1 General
A.2 Test specimens
A.2.1 General
A.2.2 Specimen 1 and Specimen 2
A.2.3 Specimen 3
A.2.4 Specimen 4
A.2.5 Specimen 5
A.2.6 Specimen 6
A.2.7 Specimen 7
A.2.8 Specimen 8
A.2.9 Specimen 9
A.3 Test report

Annex B (normative) Order of testing

Annex C (normative) Fire-resistance test method

C.1 Test equipment — Test conditions
C.2 Test specimen
C.2.1 Size
C.2.2 Number
C.2.3 Design
C.2.4 Installation of test specimen
C.2.5 Asymmetrical active fire curtains
C.2.6 Supporting construction
C.2.6.1 General
C.2.6.2 Standard supporting construction
C.2.6.3 Rigid standard supporting constructions (high or low density)
C.2.6.4 Flexible standard supporting constructions
C.2.6.5 Erection of standard-supporting and associated supporting constructions
C.2.6.6 Associated supporting constructions
C.3 Integrity
C.3.1 General
C.3.1.1 Introduction
C.3.1.2 Cotton pad
C.3.1.3 Gap gauges
C.3.1.4 Flaming
C.3.1.5 Behaviour
C.3.1.6 Pressure
C.3.1.7 Deflection
C.3.2 Radiation
C.3.2.1 Introduction
C.3.2.2 General
C.3.2.3 Apparatus
C.4 Test procedure
C.4.1 Pre-test examination and preparation
C.4.1.1 General
C.4.2 Gap measurements
C.4.3 Retention force measurements
C.4.4 Final setting
C.5 Fire test
C.5.1 General
C.5.2 Integrity
C.5.3 Insulation
C.5.4 Radiation
C.6 Field of direct application of test results
C.6.1 General

C.6.2 Materials and construction
C.6.3 General
C.6.3.1 Introduction
C.6.3.2 Specific restrictions on materials and construction
C.6.4 Fixings
C.6.5 Additional test requirements
C.7 Acceptance

Annex D (normative) Overlapping multiple active fire curtains

D.1 Introduction
D.2 Symbols
D.3 Calculation
D.4 Example for increasing overlapping systems

Annex E (normative) Test method for active fire curtains reliability and response time and the durability of materials

E.1 Principle
E.2 Test specimen
E.3 Apparatus
E.3.1 Gap gauges
E.3.2 C.3.1.2 applies.
E.4 Method
E.4.1 General
E.4.2 Procedure for proving ‘open’ circuit gravity fail-safe (see Figure E.1)
E.4.3 Procedure for proving ‘short’ circuit gravity fail-safe (see Figure E.2)
E.5 Test results
E.6 Test report

Annex F (normative) Test method for reliability of motor operation at elevated temperatures

F.1 Principle
F.2 Materials
F.3 Apparatus
F.4 Procedure
F.4.1 Furnace testing of motor(s)

Annex G (normative) Calculation of ambient temperature smoke leakage

G.1 Symbols
G.2 Calculations
G.3 Calculation of results
G.3.1 General
G.3.2 Calculation for other sizes of specimen, based on 2,3 m × 2,1 m test results

Annex H (normative) Test method for the durability and reliability of alternative or additional motors

H.1 Test specimen
H.2 Apparatus
H.3 Procedure
H.4 Test results

Annex I (normative) Test method for ancillary and optional equipment

I.1 Introduction
I.2 Test specimen
I.3 Procedure
I.4 Obstruction warning devices
I.4.1 Single beam detectors
I.4.2 Multi-beam detector
I.5 Pressure-sensitive equipment
I.6 Activation devices
I.6.1 Fire alarm
I.6.2 Smoke detector
I.6.3 Heat detector
I.6.4 Short circuit of smoke and heat detectors
I.6.5 Secondary power supply
I.6.6 Delayed and/or multi-positional deployment
I.7 Emergency egress control

I.7.1 General
I.7.2 Emergency egress failure (short circuit)
I.7.3 Emergency egress failure (fire damage)
I.8 Emergency access control
I.8.1 General
I.8.2 Emergency access failure (short circuit)
I.8.3 Emergency access failure (fire damage)
I.8.4 Self-test device
I.9 Test results
I.10 Test report

Annex J (normative) Test method for durability and force gauge

J.1 Introduction
J.2 General
J.3 Apparatus
J.4 Procedure
J.5 Performance criteria
J.6 Test report

Annex K (informative) Typical product performance summary

Annex L (normative) System design

L.1 Introduction
L.2 Active fire curtains selection
L.3 Selection of active fire curtains
L.3.1 Operational performance
L.3.2 Initiation of deployment
L.3.3 Method of deployment
L.3.4 Active fire curtains crossing access/egress routes
L.3.4.1 Introduction
L.3.4.2 General
L.3.4.3 Emergency egress controls
L.3.4.4 Emergency access controls
L.3.4.5 Overlapped active fire curtains
L.3.4.6 Overlapped active fire curtains on the side of a protected route
L.3.5 Warning systems
L.3.5.1 Deployment warning
L.3.5.2 Obstruction warning
L.4 Fire resistance
L.4.1 General
L.4.2 Radiation and tenability
L.4.2.1 General
L.4.2.2 Simplified approach for horizontal routes in dwellings
L.5 Power supplies
L.5.1 General
L.5.2 Electrical
L.5.3 Secondary power supplies

Annex M (informative) Installation

M.1 General
M.2 Side retention
M.3 Support systems for active fire curtains
M.4 Ancillary devices

Annex N (informative) Commissioning

N.1 General
N.2 Commissioning of ancillary devices
N.2.1 Initiating equipment
N.2.2 Operational equipment
N.2.3 Obstruction warning
N.2.4 Self-test facility

Annex O (informative) Inspection, testing and maintenance

O.1 General

O.2 Inspection and testing
O.3 Maintenance
O.3.1 General
O.3.2 Replacement of smoke seals

Annex P (informative) Typical approving authority pre-installation checklist

Annex Q (informative) An engineered approach to using radiative heat flux for tenable conditions for single-level horizontal routes

Q.1 Symbols
Q.2 Guidance on the determination of the acceptability of active fire curtains in terms of radiative heat flux received by escaping occupants
Q.3 Notes on the background to the development of Table Q.1 and Table Q.2
Q.4 How to use Table Q.1 and Table Q.2
Q.5 Assumptions and limitations of Table Q.1 and Table Q.2
Q.6 Working example of the methodology
Q.6.1 General
Q.6.2 Site geometry
Q.6.3 Human factors
Q.6.4 Product data
Q.6.5 Evaluating the radiative heat flux using the tables provided
Q.7 Mathematical background
Q.7.1 General
Q.7.2 Radiative heat flux
Q.7.3 Configuration factor
Q.7.4 Thermal dose unit (TDU)

Annex R (informative) Yarns and fabric materials

Annex S (informative) Typical installation checklist

Annex T (informative) Model installation certificate

Annex U (informative) Typical inspection checklist

Annex V (informative) Model commissioning certificate

Annex W (informative) Model completion certificate

Annex X (informative) Model servicing certificate

Page count: 114