

TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
TECHNISCHE SPEZIFIKATION

CEN/TS 54-14

July 2004

ICS 13.220.20

English version

Fire detection and fire alarm systems - Part 14: Guidelines for  
planning, design, installation, commissioning, use and  
maintenance

Systèmes de détection et d'alarme incendie - Partie 14:  
Guide d'application pour la planification, la conception,  
l'installation, la mise en service, l'utilisation et la  
maintenance

Brandmeldeanlagen - Teil 14: Leitfaden für Planung,  
Projektierung, Montage, Inbetriebnahme, Betrieb und  
Instandhaltung

This Technical Specification (CEN/TS) was approved by CEN on 29 April 2004 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

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

## Contents

	Page
<b>Foreword</b> .....	<b>6</b>
<b>Introduction</b> .....	<b>7</b>
<b>1 Scope</b> .....	<b>8</b>
<b>2 Normative references</b> .....	<b>8</b>
<b>3 Terms and definitions</b> .....	<b>8</b>
<b>4 General</b> .....	<b>13</b>
<b>4.1 Guideline usage</b> .....	13
<b>4.2 Guideline format</b> .....	13
<b>4.3 Safety requirements</b> .....	14
<b>4.4 False alarms</b> .....	14
<b>4.5 Warranties and guarantees</b> .....	14
<b>4.6 Documentation</b> .....	15
<b>4.7 Responsibility</b> .....	15
<b>4.8 Qualifications</b> .....	15
<b>5 Assessment of needs</b> .....	<b>15</b>
<b>5.1 Purpose</b> .....	15
<b>5.2 Consultation</b> .....	15
<b>5.3 Parts of the building needing cover</b> .....	16
<b>5.3.1 Extent of cover</b> .....	16
<b>5.3.2 Description of extent</b> .....	17
<b>5.3.3 Total cover</b> .....	17
<b>5.3.4 Compartment cover</b> .....	17
<b>5.3.5 Escape route cover</b> .....	17
<b>5.3.6 Local cover</b> .....	17
<b>5.3.7 Equipment cover</b> .....	18
<b>5.3.8 Areas not needing cover</b> .....	18
<b>5.4 Fire brigade attendance</b> .....	18
<b>5.4.1 Communications</b> .....	18
<b>5.4.2 Attendance time</b> .....	18
<b>5.5 Fire alarm response strategy</b> .....	18
<b>5.6 Documentation</b> .....	19
<b>5.7 Responsibility</b> .....	19
<b>5.8 Qualifications</b> .....	19
<b>6 Planning and design</b> .....	<b>20</b>
<b>6.1 Devices connected to the system</b> .....	20
<b>6.1.1 Components</b> .....	20
<b>6.2 System design</b> .....	20
<b>6.2.1 Compatibility</b> .....	20
<b>6.2.2 Fault effects</b> .....	20
<b>6.2.3 Hazardous atmospheres</b> .....	20
<b>6.2.4 False alarms</b> .....	20
<b>6.2.5 Other fire protection systems</b> .....	20
<b>6.2.6 Special risks</b> .....	21
<b>6.3 Zones</b> .....	21
<b>6.3.1 General</b> .....	21
<b>6.3.2 Detection zones</b> .....	21
<b>6.3.3 Alarm zones</b> .....	21
<b>6.4 Selection of detectors and manual call points</b> .....	21

6.4.1	Detectors - General.....	21
6.4.2	Smoke detectors.....	22
6.4.3	Heat detectors .....	23
6.4.4	Flame detectors .....	23
6.4.5	Manual call points.....	24
6.5	Siting and spacing of detectors and manual call points .....	24
6.5.1	General.....	24
6.5.2	Heat and smoke detectors.....	24
6.5.3	Flame detectors .....	24
6.5.4	Manual call points.....	25
6.5.5	Identification .....	25
6.6	Alarm systems and devices .....	25
6.6.1	General.....	25
6.6.2	Sound signals .....	25
6.6.3	Visual fire alarm devices .....	26
6.7	Control and indication.....	26
6.7.1	Location of control and indicating equipment .....	26
6.7.2	Repeat indications .....	26
6.7.3	Repeat controls.....	26
6.7.4	Alarm location aids.....	27
6.7.5	Fire brigade panel.....	27
6.8	Power supplies .....	27
6.8.1	Power supply equipment .....	27
6.8.2	Main power source .....	27
6.8.3	Standby supply .....	27
6.9	Signals to a fire alarm receiving station.....	28
6.10	Other equipment or systems .....	28
6.11	Cables and interconnections.....	29
6.11.1	Cable types.....	29
6.11.2	Protection against fire .....	29
6.11.3	Protection against mechanical damage .....	29
6.12	Protection against electromagnetic interference.....	29
6.13	Documentation.....	29
6.14	Responsibility .....	30
6.15	Qualifications .....	30
7	Installation .....	30
7.1	General.....	30
7.2	Siting and accommodation of equipment.....	30
7.2.1	Siting .....	30
7.2.2	Hazardous areas .....	30
7.3	Cable installation .....	30
7.3.1	General.....	30
7.3.2	Cable ducts, channels and trunking .....	30
7.3.3	Cable routing.....	30
7.3.4	Precautions against spread of fire.....	31
7.3.5	Cable joints and terminations .....	31
7.4	Radioactivity .....	31
7.5	Documentation.....	31
7.6	Responsibility .....	31
7.7	Qualifications .....	31
8	Commissioning and verification .....	32
8.1	General.....	32
8.2	Commissioning .....	32
8.3	Verification .....	32
8.4	Documentation.....	32
8.5	Responsibility .....	33
8.6	Qualifications .....	33
9	Third party approval .....	33

9.1	General.....	33
9.2	Approval by authorities and others .....	33
9.2.1	Authorities having jurisdiction.....	33
9.2.2	Insurance organisations .....	33
9.2.3	Approval by more than one body .....	33
9.3	Approval procedures.....	33
9.3.1	General.....	33
9.3.2	Inspection and testing.....	34
9.3.3	Testing of operation .....	34
9.3.4	Special tests (on-site testing).....	34
9.3.5	Documentation.....	34
9.4	Periodic inspection by an approving body .....	34
9.4.1	General.....	34
9.4.2	Documentation.....	34
9.5	Qualifications .....	35
10	Use of the system .....	35
10.1	Responsibility .....	35
10.2	Documentation.....	36
11	Maintenance .....	36
11.1	General.....	36
11.2	Inspection and servicing.....	36
11.2.1	Maintenance routine.....	36
11.2.2	Prevention of false alarms during routine testing .....	36
11.2.3	Prevention of unwanted activation during routine testing.....	37
11.3	Special servicing .....	37
11.4	Repair and modification.....	37
11.5	Spares .....	37
11.6	Documentation.....	38
11.7	Responsibility .....	38
11.8	Qualifications .....	38
12	Modification or extension of an installed system .....	38
12.1	General.....	38
12.2	Third party approval .....	38
12.3	Extent of compliance.....	38
13	Operation of other fire protection systems.....	39
13.1	General.....	39
13.2	Responsibility .....	39
14	Applications in special risks .....	39
14.1	General.....	39
14.2	Electronic data processing areas .....	40
14.3	High-rack warehouses .....	40
14.4	Atrium buildings .....	40
14.5	Hazardous areas .....	41
14.6	Outdoor areas .....	41
14.7	Responsibility .....	41
15	Integrated systems .....	41
16	Hierarchical systems.....	41
	Annex A (informative) Specific recommendations .....	43
A.1	Scope .....	43
A.2	Normative references .....	43
A.3	Definitions .....	43
A.4	General.....	43
A.4.1	Usage of the guidelines .....	43
A.5	Assessment of needs.....	43
A.5.1	Purpose.....	43

A.5.2	Consultation .....	43
A.5.3	Part of the building needing cover .....	43
A.6	Planning and design .....	45
A.6.1	System design .....	45
A.6.2	Zones .....	46
A.6.3	Selection of detectors and manual call points .....	46
A.6.4	Siting and spacing of detectors and manual call points .....	47
A.6.5	Alarm systems and devices .....	51
A.6.6	Control and indication.....	53
A.6.7	Power supplies .....	53
A.6.8	Signals to a fire alarm receiving station.....	54
A.6.9	Other equipment or systems .....	54
A.6.10	Cables and interconnections.....	54
A.7	Installation .....	55
A.7.1	General.....	55
A.7.2	Siting and accommodation of equipment.....	55
A.7.3	Cable installation .....	55
A.8	Commissioning and verification .....	56
A.9	Third party approval .....	56
A.10	Use of the system .....	56
A.11	Maintenance .....	57
A.11.1	General.....	57
A.11.2	Inspection and servicing.....	57
A.11.3	Special servicing .....	58
A.11.4	Repair and modification.....	58
A.11.5	Spares .....	59
A.11.6	Documentation.....	59
A.12	Modification or extension of an installed system .....	59
A.13	Operation of other fire protection systems.....	59
A.14	Application in special risks .....	59
A.15	Integrated systems .....	59
A.16	Hierarchical systems.....	59
	Annex B (informative) False alarms .....	60
B.1	Prevention of false alarms .....	60
B.2	Smoke detectors .....	60
B.3	Heat detectors .....	61
B.4	Flame detectors .....	61
B.5	Multi-phenomena systems.....	61
B.6	Pre-alarm warnings .....	61
B.7	Activity related systems.....	62
B.8	Pre-transmission confirmation .....	63
B.9	Investigation of false alarms .....	64
	Annex C (informative) Model documents.....	65
	Annex D (informative) Model list of fire loadings for different cable types.....	71
	Bibliography .....	76

## Foreword

This document (CEN/TS 54-14:2004) has been prepared by Technical Committee CEN/TC 72 "Fire detection and fire alarm systems", the secretariat of which is held by BSI.

This document has been prepared in cooperation with the CEA (Comité Européen des Assurances) and with EURALARM (Association of European Manufacturers of Fire and Intruder Alarm Systems).

This document is part of the EN 54 series of standards.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

## Introduction

Guidelines covering fire detection and fire alarm systems are published by many different organisations within Europe. The intention of this document is to draw together these many different documents, so as to provide a unified set of guidelines which can give a reasonable Technical Specification of planning, design, installation, commissioning, use and maintenance for fire detection and fire alarm systems throughout Europe.

It is not intended that these guidelines should override existing documents. It is expected for a considerable (and as yet unspecified) period that these guidelines will coexist with the other documents. But it is hoped that the availability of a common set of guidelines will assist in the gradual harmonisation of practice and standards of fire detection and fire alarm systems throughout Europe.

The recommendations within these guidelines are not of themselves mandatory, and have no direct power. They can however be made mandatory by being specified within another document which is itself mandatory. For example, an authority having power under local or national legislation can require compliance with the guidelines, or a contract between a purchaser and a supplier can specify compliance (which may then become mandatory for that system under contract law). The detailed methods by which recommendations become mandatory are not specified within this document, and are a matter for whichever organisation has the necessary authorities.

The main principles on which the guidelines are based are given in the body of the standard. Detailed recommendations by which these principles may be satisfied are given in Annexes.

## 1 Scope

This document provides guidelines for the application of automatic fire detection and fire alarm systems in and around buildings. The Technical Specification covers planning, design, installation, commissioning, use and maintenance of the systems.

The guidelines cover systems intended for the protection of life and/or the protection of property.

The guidelines cover systems with at least one fire detector. The systems may be capable of providing signals to initiate, in the event of a fire, the operation of ancillary equipment (such as fixed fire extinguishing systems) and other precautions and actions (such as machinery shutdown), but the guidelines do not cover the ancillary services themselves.

The guidelines do not cover systems combining fire alarm functions with other non-fire related functions.

The guidelines do not recommend whether or not an automatic fire detection and/or fire alarm system should be installed in any given premises.

It has been assumed in the drafting of this Part of EN 54 that the execution of its provisions will be trusted to appropriately competent persons. However, guidance is also given to other persons purchasing or using a fire detection or fire alarm system.

## 2 Normative references

The following referenced document is 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.

EN 54-1:1996, *Fire detection and fire alarm systems – Part 1: Introduction*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 54-1:1996 and the following apply.

### 3.1 acceptance

decision that the installed system meets the requirements of a previously agreed specification

### 3.2 alarm load

maximum power (normally electrical) that might be required under the fire condition

### 3.3

#### **ancillary equipment**

equipment which can initiate or be initiated by the fire detection and alarm system

### 3.4

#### **approval**

agreement by a third party that the installed system satisfies the requirements of the third party