



NSAI
Standards

Irish Standard
I.S. 3218:2013+A1:2019

Fire detection and alarm systems for buildings - System design, installation, commissioning, servicing and maintenance & Amendment 1:2019

I.S. 3218:2013+A1:2019

*Relationship with other documents and/or
Incorporating amendments/corrigenda issued since publication:*

		Published	Withdrawn
Consolidates	I.S. 3218:2013	17/12/2013	20/09/2019

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document is based on:
I.S. 3218:2013+A1:2019

This document was published
under the authority of the NSAI
and comes into effect on:
20 September, 2019

ICS number:
13.320

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

DECLARATION
OF
SPECIFICATION
ENTITLED
FIRE DETECTION AND ALARM SYSTEMS FOR BUILDINGS –
SYSTEM DESIGN, INSTALLATION, COMMISSIONING, SERVICING
AND MAINTENANCE
AS
THE IRISH STANDARD SPECIFICATION FOR
FIRE DETECTION AND ALARM SYSTEMS FOR BUILDINGS –
SYSTEM DESIGN, INSTALLATION, COMMISSIONING, SERVICING
AND MAINTENANCE

NSAI in exercise of the power conferred by section 16 (3) of the National Standards Authority of Ireland Act, 1996 (No. 28 of 1996) and with the consent of the Minister for Business, Enterprise and Innovation, hereby declare as follows:

1. This instrument may be cited as the Standard Specification (Fire detection and alarm systems for buildings – System design, installation, commissioning, servicing and maintenance and Amendment 1:2019) Declaration, 2019.

2. (1) The Specification set forth in the Schedule to this declaration is hereby declared to be the standard specification for Fire detection and alarm systems for buildings – System design, installation, commissioning, servicing and maintenance and Amendment 1:2019.

(2) The said Standard Specification may be cited as Irish Standard 3218:2013+A1:2019 or as I.S. 3218:2013+A1:2019.

3. (1) The Standard Specification (Fire detection and alarm systems for buildings – System design, installation, servicing and maintenance) Declaration 2013 is hereby revoked.

(2) Reference in any other standard specification to the Instrument hereby revoked and to Irish Standard 3218:2013 thereby prescribed, shall be construed, respectively, as references to this Instrument and to Irish Standard 3218:2013+A1:2019.

I.S. 3218:2013+A1:2019

Foreword

The aim of this Standard is to promote wider understanding of the different types of fire detection and alarm systems and modes of operation which may be employed. It also aims to encourage uniformity of application, based on providing enhanced safety to persons in the event of an outbreak of fire and having due regard to the hazard level and degree of familiarity and alertness of occupants within particular buildings.

Fire detection and alarm systems are an integral part of the overall protection of the building. The contents of this Standard should therefore be considered by all disciplines involved in the design process.

A1 Amendments are indicated by the TAG **A1** **A1** **A1**

A1 This Standard is an amendment to I.S. 3218:2013. It **A1** has been prepared with the assistance of the National Standards Authority of Ireland Fire Safety Standards Committee (FSSC), representation on which includes the Chief Fire Officers Association (CFOA), Engineers Ireland (EI), the Irish Insurance Federation (IIF), major users represented by the Office of Public Works (OPW), the Health Services Executive (HSE), the Institution of Fire Engineers (IFE), the Irish fire industry represented by the Fire Engineering Systems Association (FESA) and the Fire Industry Association of Ireland (FIAI) and Fire Alarm Manufacturers.

A1 A number of revisions have been made with the main changes in Clause 9. This Standard includes a number of minor editorial corrections which are not detailed in this document. **A1**

Compliance with an Irish Standard does not of itself confer immunity from legal obligations. Special risks or hazards should be identified in the initial risk assessment and any specific standards applying to these should be agreed amongst the parties.

When it has been determined that a fire detection and alarm system is required, then in the absence of any other regulatory requirement, this standard is suitable.

It is expected that users of this Standard are competent, and should have sufficient training, experience and knowledge appropriate to the nature of the work to be undertaken (see definition, **competent person**).

Such persons should be able to demonstrate their competence to the satisfaction of the Client/User, and are advised to consider third party Certification, which may be coupled with assessment of a quality system such as one in accordance with I.S. EN ISO 9001.

There are a number of Annexes to this Standard. These Annexes are referred to as either Normative or Informative Annexes. Normative Annexes are mandatory for compliance with this Standard whereas Informative Annexes are for information only.

IMPORTANT — For transition arrangements from I.S. 3218:1989 & I.S. 3218:2009 to I.S. 3218:2013**A1** +A1:2019 **A1**, see Clause 4.

Contents

	Page
DECLARATION	1
Foreword	2
1 Scope	9
2 Normative references	9
3 Terms and definitions	11
4 Transition arrangements from I.S. 3218:1989, I.S. 3218:2009 ^(A1) & I.S. 3218:2013 to I.S. 3218:2013 +A1:2019 ^(A1)	23
5 System design: Overview	24
5.1 General	24
5.2 Premises in multiple occupancy	24
5.3 Confirmation of system category	25
5.4 Fire detection and alarm system design development and implementation process	25
5.4.1 General	25
5.4.2 Fire Safety Strategy development	25
5.4.3 Design process	26
5.4.4 Installation and commissioning	27
5.4.5 User actions	27
5.5 Certification	27
6 Design considerations	27
6.1 Purposes of fire alarm systems	27
6.2 Design process	27
6.2.1 General	27
6.2.2 Fire safety strategy	28
6.2.3 Early discussion	28
6.2.4 Controlled software	29
6.2.5 Multiple occupancy buildings (X)	29
6.2.6 Actuation of ancillary services	29
6.2.7 Installation in potentially explosive or flammable atmospheres	29
6.2.8 Initial phase of the design process	30
6.2.9 Detailed design process	31
6.2.10 Additional Considerations	32
6.3 Circuit design	33
6.3.1 General	33
6.3.2 Circuits containing fire detectors	34
6.3.3 Circuits containing alarm devices	34
6.3.4 Loop Circuits	35
6.3.5 Circuits protected against cable faults	35
6.3.6 Compatibility	35
6.3.7 Compliance with standards	36
6.3.8 Program controlled systems	36
6.3.9 Early warning (pre-alarm)	36
6.3.10 Time related systems	37

I.S. 3218:2013+A1:2019

6.4	Zones.....	37
6.4.1	General considerations.....	37
6.4.2	Requirements for the size and number of detection zones.....	39
6.4.3	Zoning of manual call points.....	41
6.5	Communications for emergency response via off-site organisations.....	41
6.5.1	General.....	41
6.5.2	Automatic transmission of the alarm.....	41
6.5.3	Non-automatic transmission of the alarm.....	42
6.6	Audible and visual alarms.....	42
6.6.1	General.....	42
6.6.2	Sounders adjacent to CIE.....	42
6.6.3	Fire alarm sounders.....	42
6.6.4	Audibility of alarms.....	43
6.6.5	Grouping of fire alarm sounders.....	45
6.6.6	Audible warning of operation of CIE.....	45
6.6.7	Visual, tactile and other alarm signals.....	45
6.6.8	Coded fire alarm signalling.....	47
6.6.9	Two-stage fire alarms.....	47
6.6.10	Staff alarms.....	47
6.6.11	Silencing devices.....	48
6.6.12	Audible alarms by intercommunication or public address equipment (voice alarms).....	48
6.6.13	Limitation of alarm information.....	49
6.6.14	Use of the fire alarm sound for other purposes.....	49
6.7	Manual call points.....	49
6.7.1	General.....	49
6.7.2	Siting.....	50
6.7.3	Multiple exits to open air.....	52
6.8	Types of fire detectors.....	53
6.8.1	General.....	53
6.8.2	Heat-sensitive detectors.....	53
6.8.3	Smoke detectors.....	54
6.8.4	Flame detectors.....	55
6.8.5	Carbon monoxide fire detectors.....	56
6.8.6	Multi-sensors.....	56
6.9	Choice of fire detectors.....	57
6.9.1	General.....	57
6.9.2	Heat detectors.....	57
6.9.3	Smoke detectors.....	57
6.9.4	Flame detectors.....	58
6.9.5	Carbon monoxide fire detectors.....	59
6.9.6	Video detection systems.....	59
6.10	Systems installed for life safety.....	59
6.10.1	General.....	59
6.10.2	Manual systems (Category M).....	60
6.10.3	Automatic detection systems (Category L).....	60
6.10.4	Spacing and siting of detectors (see also 6.10.6 and 6.10.7).....	63
6.10.5	General (structural) considerations.....	66
6.10.6	General detector use and siting considerations.....	73
6.10.7	Use and siting of detectors in specific areas (see 6.10.3.4.3).....	76
6.11	False alarms.....	78
6.11.1	General.....	78
6.12	Control and Indicating Equipment (CIE).....	78
6.12.1	General.....	78

6.12.2	Choice of equipment	78
6.12.3	Siting.....	79
6.12.4	Lighting level.....	80
6.12.5	Sound level.....	80
6.12.6	Fire risk.....	80
6.12.7	External siting.....	80
6.12.8	Indications of origin of alarms.....	81
6.12.9	Accessibility of Indications and Controls (refer also to Annex A in I.S. EN 54-2:1999).....	82
6.13	Power supplies	82
6.13.1	General	82
6.13.2	Connection of a fire alarm system to a public or private power distribution supply.....	83
6.13.3	Types of power supply.....	83
6.13.4	Maximum alarm load	84
6.13.5	Requirements and recommendations for duration of the emergency supply.....	85
6.13.6	Siting.....	86
6.14	Cables, wiring and other interconnections	86
6.14.1	General	86
6.14.2	Resistance to fire	87
6.14.3	Data/voice cables	88
6.14.4	Cable systems.....	88
6.14.5	Joints, terminations and glanding	90
6.14.6	Cable size	90
6.14.7	Colour coding	90
6.15	Radio-linked systems.....	91
6.15.1	General	91
6.15.2	Power supplies	91
6.15.3	Radio links.....	92
6.15.4	Installation.....	92
6.16	Ancillary services.....	94
6.17	Radio and electrical interference	94
6.17.1	Generated interference	94
6.17.2	Received interference	94
7	Ⓐ Prevention Ⓐ of false alarms(see definition)	94
7.1	Categories of false alarms.....	94
7.1.1	General	94
7.1.2	Undesirable false alarms	95
7.1.3	Equipment false alarms.....	96
7.1.4	Malicious false alarms.....	96
7.1.5	False alarms with good intent.....	96
7.2	Causes of false alarms	96
7.2.1	General	96
7.2.2	Recommendations/Action	96
7.3	Responsibility for prevention of false alarms	96
7.3.1	Designer responsibility	96
7.3.2	Installer responsibility.....	96
7.3.3	Responsibility of parties involved in Commissioning/Handover/Verification.....	97
7.3.4	Ⓐ User responsibility	97
7.3.5	Ⓐ Servicing/Maintenance organisations	98
7.4	Design process for Ⓐ prevention Ⓐ of false alarms.....	98
7.4.1	Risk Assessment/Analysis of false alarm potential	98
7.4.2	Action by Designer	100
7.5	Action by the User to limit false alarms.....	100

I.S. 3218:2013+A1:2019

7.5.1	General.....	100
7.5.2	Monitoring to reduce false alarm rates.....	100
7.5.3	Performance monitoring of newly commissioned systems (User responsibility).....	101
7.5.4	System management (User responsibility)	101
8	Workmanship, installation and commissioning.....	101
8.1	Work off-site - Packing.....	101
8.2	Work on-site	101
8.3	Siting of equipment	101
8.3.1	General.....	101
8.3.2	Protection against lightning.....	102
8.3.3	Areas which contain hazards	102
8.3.4	Structural accommodation	102
8.3.5	Precautions against spread of fire	102
8.4	Installation of equipment.....	102
8.4.1	Delivery and storage.....	102
8.4.2	Protection	102
8.4.3	Radioactivity.....	103
8.5	System commissioning, testing and handover	103
8.5.1	New systems.....	103
8.5.2	Modifications (extensions and alterations)	103
8.5.3	Wiring.....	103
8.5.4	Processes.....	104
8.5.5	Parties	104
8.5.6	Responsibilities	104
8.5.7	Inspection	104
8.5.8	Testing/Commissioning.....	106
8.5.9	Commissioning, testing and handover documentation.....	108
8.5.10	Handover.....	109
8.5.11	Optional processes	111
8.6	Certification of verification	112
9	User responsibilities.....	112
9.1	General.....	112
9.1.1	Supervision.....	112
9.1.2	Records	113
9.1.3	Radioactivity.....	114
9.1.4	Prevention of false alarms (see 7.3.4, 7.3.5 and 7.5).....	114
9.2	Servicing and maintenance	115
9.2.1	General.....	115
9.2.2	Routine procedures.....	115
9.2.3	Special servicing.....	118
9.2.4	Detector servicing and testing.....	121
9.2.5	Standby supply batteries.....	123
9.2.6	Spare parts.....	124
10	Fire alarm systems in residential buildings.....	124
10.1	Assessing the risk.....	124
10.2	Fire protection in dwellings	124
10.2.1	General.....	124
10.2.2	Individual Dwellings	125
10.2.3	Buildings containing apartments/flats and/or maisonettes	126
10.2.4	mixed user building (see definition).....	127
10.2.5	Residential (Institutional) buildings	127

10.3	Audibility of smoke/heat alarms	127
10.4	Cables for interconnecting smoke/heat alarms	128
10.5	Installation, testing, commissioning and certification of smoke/heat alarms.....	128
10.5.1	Installation.....	128
10.5.2	Testing and commissioning	128
10.5.3	Certification	128
10.6	Documentation/User instructions/completion/handover of smoke/heat alarm systems	128
10.7	Routine testing, servicing, of smoke/heat alarm systems.....	129
10.8	Existing multiple-occupancy residential buildings.....	129
10.9	Existing dwelling houses.....	129
	Annex A (informative) Compatibility requirements.....	130
	Annex B (informative) Automatic connection to the Alarm Receiving Centre (ARC)	133
	Annex C 1 (normative) Fire detection and alarm system – Certificate of Design	137
	Annex C 2 (normative) Fire detection and alarm system – Certificate of Installation.....	139
	Annex C 3 (normative) Fire detection and alarm system – Final Certificate of Commissioning	140
	Annex C 4 (normative) Fire detection and alarm system – Certificate of commissioning for modification, extension or alterations to a system	141
	Annex C 5 (normative) Fire detection and alarm system – Certificate of Commissioning for early handover for beneficial use	142
	Annex C 6 (normative) Fire detection and alarm system – Certificate for Handover	143
	Annex C 7 (normative) Fire detection and alarm system – Certificate of Verification	145
	Annex D 1 (normative) Fire detection and alarm system- Annual Certificate of Servicing/Testing	146
	Annex D 1 (normative) Fire detection and alarm system- Annual Certificate of Servicing/Testing	147
	Annex D 2 (normative) Fire detection and alarm system: schedule of servicing/testing.....	148
	Annex E 1 (informative) Model logbook for fire alarm systems – Front page	149
	Annex E 2 (informative) Model logbook for fire alarm systems – General register	150
	Annex E 3 (informative) Model logbook for fire alarm systems – False alarm register.....	151
	Annex F (normative) Ionisation chamber smoke detectors.....	152
	Annex G (informative) Fire alarm systems integrated with other systems.....	153
	Annex H (informative) Responsibilities	155
	Annex I (informative) Guide to recommendations applicable to specific types of premises	156
	Annex J (normative) Guidance on layout of smoke/heat alarms in dwelling houses, apartments or maisonettes.....	157
	Annex K (normative) Model certificate of design, installation and commissioning of smoke/heat alarm systems in dwellings.....	158
	Annex L (normative) Model certificate of servicing/testing of a smoke/heat alarm system in dwellings.....	159
	Annex M (informative) Staged (Phased) Fire Alarms	160

I.S. 3218:2013+A1:2019

Annex N (informative) Inputs/Outputs..... 162
Bibliography..... 163
Acknowledgements..... 164

Tables

Table 1 — Manual call point siting in staircases..... 51
 Table 2 — Limits for siting point detectors 64
 Table 3 — Limits of ceiling heights 65
 Table 4 — Sensitivity of Smoke detectors..... 65
 Table 5 — Spacing of Detectors on Honeycomb/Coffered Ceilings..... 69
 Table 6 — Spacing of detectors on ceilings with closely spaced structural beams/joists 71
 Table 7 — False alarm considerations..... 99

Figures

Figure 1 — Detection Zones 39
 Figure 2 — Marginal sound levels 44
 Figure 3 — Multiple room and multiple exits (e.g. typical office/hospital ward) 52
 Figure 4 — Single room and multiple exits (e.g. typical function room)..... 53
 Figure 5 — Height and clearance below ceilings..... 66
 Figure 6 — Obstructions..... 67
 Figure 7 — Typical Honeycomb Detail 68
 Figure 8 — Siting of Smoke (Heat) Detectors 69
 Figure 9 — Spacing of Detectors 69
 Figure 10 — Closely spaced beams/joists..... 70
 Figure 11 — Toilets/WCs with multiple cubicles 78
 [A1] Figure N.1 — Fire detection and fire alarm system and associated systems, functions and equipment [A1] 163

Schedule

Fire Detection and Alarm Systems for Buildings - System Design, Installation, Commissioning, Servicing and Maintenance

1 Scope

This Standard provides requirements and recommendations for the planning, design, installation, commissioning, servicing and maintenance of fire detection and alarm systems in premises including those used for residential/domestic purposes. The Standard does not recommend whether or not a fire alarm system should be installed in any given building (see Building Regulations, Technical Guidance Document B). When it has been determined that a Fire Detection and Alarm System (FDAS) is required, this standard is suitable.

The systems covered in this Standard are referred to as Fire Detection and Alarm Systems (FDAS). The Standard covers systems ranging from simple installations with one or two manual call points, up to complex installations with automatic detectors, manual call points, control and indicating equipment, and communication with the public fire service, etc. It also covers the provision of signals to initiate, in the event of a fire, the operation of ancillary services (see 6.16) and other precautions and actions.

The required service, maintenance and repair of ancillary services are not covered in this Standard.

Consultation with the appropriate Fire Authority is advised before undertaking the design or installation.

This Standard does not cover systems combining fire alarm functions with other non-fire related functions, although some guidance on such integrated systems is given in Annex G.

This Standard does not cover systems whose primary function is to extinguish or control the fire, such as sprinkler or automatic extinguishing systems, even though they might have a secondary alarm function. It does, however, cover the use of a signal from an automatic extinguishing system as one initiating element of a fire alarm system.

Recommendations for fire protection for electronic equipment installations are given in BS 6266.



2 Normative references



This Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to or revisions of any of these publications apply to this Irish Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

I.S. 3217  , Emergency Lighting

I.S. EN 54-2:1999/A1:2006, Fire detection and Fire Alarm Systems – Part 2: Control and Indicating Equipment

I.S. EN 54-4, Fire Detection and Fire Alarm Systems – Part 4: Power Supply Equipment

I.S. EN 54-5  , Fire detection and Fire Alarm Systems – Part 5: Heat Detectors – Point Detectors

I.S. EN 54-7  , Fire detection and Fire Alarm Systems – Part 7: Smoke Detectors – Point Detectors using scattered light, transmitted light or ionization

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-