

# **G4S**

# **FIRE SYSTEMS Ltd**

'Fire Systems Overview'  
February 2015

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Securing Your World



# **Why do you need fire detection systems?**

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## 2 Main reasons:

- Protection of life
- Protection of Property

## Determined by:

- Legislation
  - Health and Safety at Work act, Building Regulations
- Insurance requirements

# Legislation

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**The Irish fire detection system standard (IS3218) does not recommend whether or not a system is installed.**

Compliance with Health and safety at work act:

- Provision of a method of setting off an alarm warning and provision of a method of hearing an alarm warning

Building Regulations:

- Technical Guidance Document 'B'

# Technical Guidance Document 'B'

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- **Means of escape in case of fire.**
- A building shall be so designed and constructed that there are adequate means of escape in case of fire from the building to a place of safety outside the building, capable of being safely and effectively used.
- **Internal fire spread (linings).**
- For the purpose of inhibiting the spread of fire within a building, the internal linings -
- (a) shall have, either a rate of heat release or a rate of fire growth and a resistance to ignition which is reasonable in the circumstances
- (b) shall offer adequate resistance to the spread of flame over their surfaces

# Technical Guidance Document 'B'

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- **Internal fire spread (structure).**
- A building shall be so designed and constructed that, in the event of fire, its stability will be maintained for a reasonable period.
- A wall common to two or more buildings shall be so designed and constructed that it offers adequate resistance to the spread of fire between those buildings.
- A building shall be sub-divided with fire resisting construction where this is necessary to inhibit the spread of fire within the building.
- A building shall be so designed and constructed that the unseen spread of fire and smoke within concealed spaces in its structure or fabric is inhibited where necessary.
- A house in a terrace and a semi-detached house are each to be treated as being a separate building.

# Technical Guidance Document 'B'

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- **External fire spread.**
- The external walls and roof of a building shall be so designed and constructed that they afford adequate resistance to the spread of fire to and from neighbouring buildings.
  
- **Access and facilities for the fire service.**
- A building shall be so designed and constructed that there is adequate provision for access for fire appliances and such other facilities as may be reasonably required to assist the fire service in the protection of life and property.

# Methods of detecting fire

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## People:

- A persons sense of smell and ability to detect fire is better than any electronic smoke detector

## Fire Detectors:

- Unoccupied areas/ times
- Danger aspect
- Building/ site wide Alarm sounding

# The Fire Alarm System 'Bible'

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## Irish Standard 3218:

- Determines categories of Fire Detection Systems
- Determines Audibility requirements
- Provides a method of certified compliance



# Irish Standard 3218: 2013 Version

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- IS3218 Standard updated and now in force
- Certification process improved for design etc
- Updates on audibility of sounders and requirement for beacons etc.

# IS 3218 BASIC GUIDE

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- Smoke detectors max 6m from a wall.
- Smoke detectors must be at least 0.5m from a wall.
- Smoke detectors must be within 0.6m of the highest point of the room
- Sounder Audibility  
65db generally  
75db at the bedhead.
- Call points shall be located at all final exits, storey exits, stairways, refuge areas.
- In addition to the above the max travel distance is 30m.
- In cases of malicious operation covers are permitted but must be noted on the certificate

# IS 3218 CATEGORIES OF COVER

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- Type **M** systems have manual call points only.

## Detection Systems

- **L1** Coverage throughout the entire protected area.
- **L2** As above but coverage only in defined vulnerable areas of the building. Must contain coverage of an L3 or L4 system however.  
Shown as L2/L3 or L2/L4
- **L3** Coverage in escape routes and adjoining areas.

- **L4** Coverage in escape routes only. (Do not use without technical advice as there are 4 very strict criteria also to be met).

## Notes:

- All Detection systems **MUST** also have Call points (Break Glass units)
- The suffix **X** is used for multiple occupancy systems eg (Apartments)

# TYPES OF DETECTORS 1

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- **Smoke detection**

- **Optical type**

- This uses a light source to detect smoke. It will detect larger particles from smouldering fires. When located in a corridor they would detect an adjoining room fire more quickly than an ionisation type of sensor.

- **Ionisation type**

- This uses a radioactive source to detect smoke from clean burning fires producing small particles such as timber burning. Affected by high air flow and humidity.

- **Heat detection**

- **Rate of Rise (ROR) types**

- These detect a certain temperature change over a certain time. They also have a max fixed temperature (Generally 55C). They are the most sensitive of the heat detectors and are for general use where a smoke sensor would not be suitable.

- **Fixed Temperature Type**

- This only responds at a pre-set fixed temperature. (Typically 75C). They would be used in higher ambient temperatures such as boiler houses etc.

# TYPES OF DETECTORS 2

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- **Smoke/ Heat detection**
- **Multisensor**
- This uses a combination of smoke and heat detection to provide optimum fire detection combined with high immunity from nuisance alarms. The intelligent type can be programmed to percentages of each phenomenon and can even change status at night. This would allow heat detection when people are present and smoke detection when they are not.
- **CO detection**
- These detect the smouldering aspect of a fire and provide early warning along with high immunity from nuisance activations from Steam etc.
- They are not to be used in isolation and must be mixed with standard fire detectors.

# IS 3218: Daily attention

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- **Daily attention by the user: A check should be made every day to ascertain the following:**
- **That either the panel indicates normal operation, or if not, that any fault indicated is recorded in the log book.**
- **That any fault warning previously recorded has received attention**

# IS 3218: Weekly Testing

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- **Weekly attention by the user: The following tests shall be made every week to ensure that the system is capable of operating under alarm conditions.**
- **(a) At least one call point on at least one circuit should be operated to test the ability of the control and indicating equipment to receive a signal and to sound the alarm and operate any other warning devices. For systems having 13 detection zones or less, each zone should be tested in turn; if there are more than 13 zones then more than one zone may need to be tested in any week so that the interval between tests on one circuit does not exceed 13 weeks. It is preferable that each time a particular circuit is tested a different trigger devices is used. An entry should be made in the log book quoting the particular trigger devices that has been used to initiate the test.**

# Procedure for Weekly Testing

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- **Pick a set time, on a set day of the week, and notify staff of same.**
- **Use test key to operate call point.**
- **Verify that alarm sounders activate.**
- **Verify that the control panel indicates the correct location**
- **Silence the sounders using the appropriate control switch**
- **Reset the panel using the appropriate control switch**
- **Record the test in the log book.**



# Periodic Service tests

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**At least 4 times per annum (2-4 months apart)**

## **Servicing Must be carried out by a competent person**

- Visually inspect the system and note any defects or changes in line with IS3218.
- Visually inspect the site. Note any defects in the equipment and any recommendations for alterations in the system to cover use/ risk changes
- Test detectors/ call points and carry out sounder test.
- Ensure that the equipment is clean and presentable.
- Ensure that instruction or zone charts are in place and are in good order. This includes the site logbook.

# Annual Service tests

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- **IS3218 requires annually:**
- Periodic service testing has taken place
- Each detector should have been checked for correct operation in accordance with the manufacturer's recommendations.
- A visual inspection should have been made to confirm that all cable fittings and equipment are secure, undamaged and adequately protected.
- Any defects should have been recorded in the log book and reported to the responsible person, and action taken to correct it.
- A certificate of testing should be given to the responsible person.

# Servicing Certification

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- **D1 and D2 Certificates must be issued**
- **D1 issued to customer (2 page certificate)**
- **D2 must be affixed at the control panel**

(By assessing this you will get a good indication of the quality and compliance of the system/ servicing)

# Property orientated systems

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## Insurance Requirements:

- Provision of adequate fire detection and specialised automatic extinguishing coverage in specified areas/risks.

## Examples:

Electrical Rooms

Warehouses

Archive Stores

Irish Standard 3218/ BS/EN/ISO/NFPA Standards apply

# Detector Types

## Smoke Detection:

- Point type Optical and Ionisation
- Multi-sensor
- Carbon Monoxide
- Beam
- Air sampling



## Heat detection:

- Point Type and LHD:
- ONLY to be used carefully and where Smoke detection is not possible
- LHD for cable trays and cable ducts



Irish Standard 3218 and EN Standards apply

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# The Best Detector for the Job?

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	Clean room; computer suite	Office; hospital ward; hotel room	Warehouse; bar	Loading area (with fork-lift trucks)	Car park (enclosed, ventilated)	Kitchen; laundry	Boiler room
Mode	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
ION	■	■ ■ ■	■ ■	■ ■			
OPTICAL	■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■		■
MULTI	■	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■
HEAT			■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■

■ Suitable

■ Recommended

*There is a suitable Fire detector for every type of environment*

# Fire Extinguishing Systems

## Computer/ Server Rooms:

MUST be 'People Friendly' systems

## 2 Main Options:

Synthetic agents or Inert agents

## Synthetic agents:

- FM200 and Novec.
- Small storage space required

## Inert Agents:

- Inergen - Argon /Nitrogen/CO2.
- Watermist
- Large storage space required

## Electrical Cabinets:

Trace type or fixed CO2



# Fire Extinguishing Systems

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## Specialist Applications:

### Kitchen Canopies:

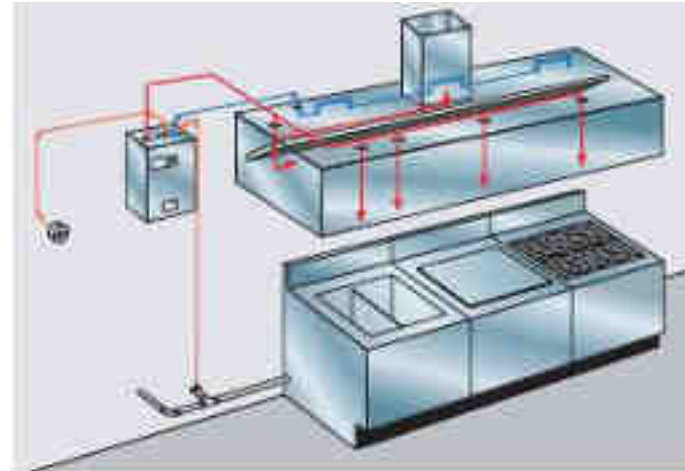
- Wet Chemical

### Machine or Archive storage:

- Watermist
- Firetrace
- FM200
- Inert

### Electrical Cabinets:

Trace type or fixed CO2



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# Fire Suppression Systems

## ISO14520/ ISO15004 Summary

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- INTERNATIONAL STANDARDS  
**ISO 14520/ 15004**
- **Fire-extinguishing systems —**
- Throughout ISO 14520/ 15004.... the word "shall" indicates a mandatory requirement; the word "should" indicates a recommendation or that which is advised but not required.
- The design, installation, service and maintenance of fire-extinguishing systems shall be performed by those competent in fire extinguishing system technology.

# Fire Suppression - Inspection

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- At least annually, or more frequently as required by the authority, all parts of the systems shall be thoroughly inspected and tested for proper operation by competent personnel.
- At least every 6 months, the Fire suppression cylinders shall be checked for the following:
  - The cylinder's casing and actuator(s) are undamaged;
  - Cylinders are securely mounted;
  - Cylinders are free from corrosion;
  - Pressure testing date (10 years)
- Discharged cylinders removed during service or maintenance procedures shall be collected and recycled, or disposed of in an environmentally sound manner, and in accordance with existing laws and regulations.

# Fire Suppression - Room Integrity

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- At least every 12 months it shall be determined whether boundary penetration or other changes to the protected enclosure have occurred that could affect leakage and extinguishant performance.
- Where the integrity test reveals increased leakage that would result in an inability to retain the extinguishant for the required period, remedial action shall be carried out.
- Where it is established that changes to the volume of the enclosure or to the type of hazard within the enclosure, or both, have occurred, the system shall be redesigned to provide the original degree of protection.
- It is recommended that the type of hazard within the enclosure, and the volume it occupies, be regularly checked to ensure that the required concentration of extinguishant can be achieved and maintained.
- Where pressure relief vents are installed the devices shall be inspected for any mechanical damage and other impacts that could affect their operation. Effective vent area shall be checked for conformance with the design calculations.

# Fire Suppression - Servicing

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- The user shall carry out a program of inspection, arrange a service schedule, and keep records of the inspections and servicing.
- **NOTE The continued capability for effective performance of a fire fighting system depends on fully adequate service procedures with, where possible, periodic testing.**
- Installers should provide the user with a record in which inspection and service details can be entered.
- **User's program of inspection**
- Weekly: Visually check the hazard and the integrity of the enclosure for changes which might reduce the efficiency of the system. Carry out a visual check that there is no obvious damage to the system and that all operating controls and components are properly set and undamaged. Check pressure gauges and weighing devices, if fitted, for correct reading and take the appropriate action specified in the users' manual.
- Monthly: Check that all personnel who may have to operate the equipment or system are properly trained and authorized to do so and, in particular, that new employees have been instructed in its use.

# Fire Suppression - Training

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## Requirement

- All persons who may be expected to inspect, test, maintain or operate fire-extinguishing systems shall be trained and kept adequately trained in the functions they are expected to perform.
- Personnel working in an enclosure protected by an extinguishant agent shall receive training in the operation and use of the system, in particular regarding safety issues.

# Minimising Nuisance Alarms

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## Dust/ fumes

High immunity available from Intelligent systems and Multi-sensor detectors

## Water/ Steam issues can be minimised with:

Air Sampling with Filters/ water traps

CO Detection

Multi-sensor detectors

## Insects

Particularly affects 'optical' detectors

Consider Beam detection, CO Detection or Air Sampling units

## People!

Usually the single biggest problem and the hardest to solve  
'Housekeeping and Training'

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