Security Fog Systems: Installation, Commissioning and Maintenance

Code of practice

THE VOICE OF THE **PROFESSIONAL SECURITY INDUSTRY**

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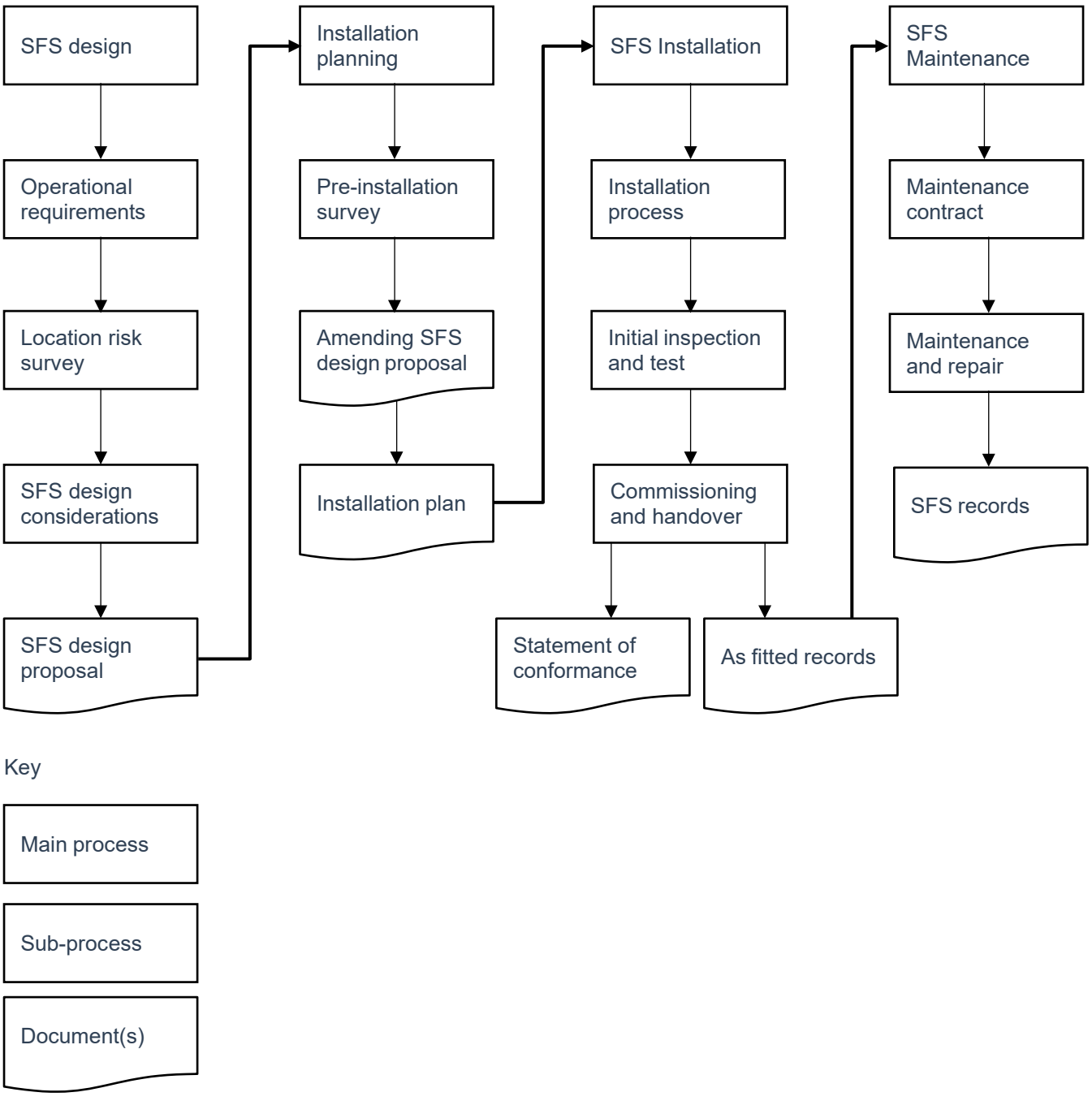
Contents

1. Introduction

This code of practice is intended to support the design, installation, commissioning, operation and maintenance of security fog systems (SFS) consisting of one or more security fog devices (SFD) conforming to EN 50131-8 and to ensure, as far as is practical, that such security fog systems (SFS), when installed, are focussed on mitigating the risks present while also satisfying the operational requirements for which they have been applied.

This code of practice is a useful aid for all stakeholders including insurers, intruder alarm companies, purchasers, users and responders (e.g. police, staff, security officers) in understanding the key requirements of the deployment (i.e. design, installation, commissioning, operation and maintenance) of SFD/SFS.

This code of practice is set out in the logical order in which a SFS would normally be deployed. The flowchart below shows the key processes and documentation described in this code of practice.



Each process is described separately, but it is accepted that in practice, some of the processes may be carried out simultaneously or in a different order. It is also accepted that some processes are totally dependent on other processes being executed.

It is assumed that to achieve the objective of this code of practice all processes are executed completely and competently, and in the spirit to which they were intended.

Those responsible for the design, installation, commissioning, operation and maintenance of SFD/SFS should be conversant with relevant British and European Standards relating to SFD/SFS (as listed in the normative references) and any associated legal requirements.

2. Scope

This code of practice describes processes and provides guidance on the criteria for design, installation, operation and maintenance of SFS that utilise intruder and/or hold-up alarm systems as an activation (or trigger) method. It applies to SFD when deployed in the context as being a component of an SFS and is intended to supplement the provisions of BS EN 50131-1, CLC/TS 50131-7 and EN 50131-8 as they apply to the installation of SFD when interacting with an intruder and/or hold-up alarm system as an SFS.

This code of practice is intended to assist those responsible for selecting equipment appropriate to both the level of performance required and the environmental conditions in which the equipment will be required to operate.

The objective of this code of practice is to ensure that SFS activate only when required and sufficiently reduce visibility in the protected area when activated.

This code of practice is not intended to cover standalone or vehicular SFDs.

Note: *This code of practice does not address any legal requirements, it is therefore expected that those who follow the recommendations of this code of practice make themselves aware of any legal obligations arising from their activities.*

3. Normative references

The following referenced documents are useful in the application of this code of practice. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN 50131-1, Alarm systems – Intrusion and hold-up systems – Part 1: System requirements
BS EN 50131-5-3, Alarm systems - Intrusion systems - Part 5-3: Requirements for interconnections equipment using radio frequency techniques
BS EN 50131-6, Alarm systems - Intrusion and hold-up systems - Part 6: Power supplies
BS EN 50131-8, Alarm systems – Intrusion and hold-up systems Part 8: Security fog devices
BS EN 61082-1, Preparation of documents used in electrotechnology. Rules
PD CLC/TS 50131-5-1, Alarm systems — Intrusion systems Part 5-1: Interconnections — Requirements for wired Interconnection for I&HAS equipments located in supervised premises
DD CLC/TS 50131-7, Alarm systems — Intrusion and hold-up systems Part 7: Application guidelines
PD 6662, Scheme for the application of European Standards for intrusion and hold-up alarm systems
BS 7671, Requirements for Electrical Installations. IET Wiring Regulations

4. Terms, definitions and abbreviations

4.1. Terms and definitions

As per BS EN 50131-1, DD CLC/TS 50131-7 and BS EN 50131-8 and the following:

Anti-burglary Performance
A combination of volume and speed of fog production so as to provide a sufficient level of obscuration in the protected area required to confront and deter individual(s) engaged in a burglary where staff and/or members of the public are not present.

Anti-raid Performance
A combination of volume and speed of fog production so as to provide a sufficient level of obscuration in the protected area required to confront and deter individual(s) engaged in a robbery where staff and/or members of the public are present.

As fitted document
Document in which details of the SFS as actually installed, are recorded.

Client
Person or organisation purchasing the SFS.

***Note**: The user of a SFS may also be taken to include a client.*

hold-off detection
Detection covering the protected area that is independent of the IAS but integral to the SFS, utilising suitable technology in order to determine whether or not the SFS should be activated and that will provide a trigger to activate the SFS, when required.

Security fog device (SFD)
Device or a series of separate parts that make up a device within tamper resistant housing(s), that, when activated, produce, in the protected area, a security fog from a consumable. For the purposes of this code of practice a security fog device conforming to BS EN 50131-8.

Security fog system (SFS)
A security risk mitigation solution comprised of one or more SFDs that has been designed to provide the necessary level of obscuration in the protected area following an activation of the intruder and/or hold up alarm system. For the purposes of this code of practice the security fog system is activated by an intruder and/or hold up alarm system conforming to the recommendations of PD 6662, or following further verification, by an ARC.

User
Person authorised to operate an SFS.

***Note**: The client may also be a user.*

4.2. Abbreviations

ARC	Alarm Receiving Centre
HAS	Hold-up alarm system(s)
HD	Hold-up device(s)
IAS	Intruder alarm system(s)
IAS and/or HAS	Intruder and/or hold-up alarm system(s)
OR	Operational requirements
SFD	Security fog device
SFS	Security fog system
VSS	Video surveillance system(s)

5. SFS general

SFS should be installed, operated and maintained in a manner consistent with the manufacturer's recommendations for the SFD(s) and other equipment utilised in the SFS, the environmental conditions under which it is expected to operate and the recommendations of this code of practice. This may necessitate collaboration between the manufacturer, installer and user to attain the appropriate outcomes, where this is the case, those who are responsible for the installation should ensure that, where necessary, the appropriate contract(s) and/or support is formalised and implemented.

5.1. Responsibility
The responsibility for each individual stage in the process of supplying a SFS should be clearly defined and agreed between the relevant parties.

5.2. Persons with responsibility
Persons responsible for risk assessment and/or the design, installation planning, system installation, commissioning, maintenance and repair of SFS should:

- be appropriately qualified;
- have the necessary training and experience, and;
- have the appropriate tools and test equipment.

5.3. Confidentiality
Information relating to the design, installation, operation and maintenance of SFS should be treated as confidential.

5.4. Electrical safety
All electrical work undertaken should be in accordance with the recommendations of BS 7671 the IET Wiring Regulations for the installation of electrical wiring.

5.5. Equipment requirements
All SFD products utilised in SFS should be tested and certified to show full conformance with BS EN 50131-8 by an accredited 3rd party test house.

BS EN 50131-8 2019, clause 7.1, requires 'reduction of visibility to 1 m within 60 s in a minimum volume of 150m^3'. This may not be appropriate (e.g. for greater volumes) or sufficient for an installed SFS. It is recommended that actual obscuration performance of an SFS in the defined protected area is in accordance with table 1 of this code of practice.

Where the protected area has a volume less than 150m^3 an SFD (or SFDs combined into an SFS) not meeting the test requirements of BS EN 50131-8 2019, clause 7.1 is permitted, providing the SFS performance given in table 1 is achieved by the SFS and justification is given in the SFS design proposal.

5.6. Other components
Other components may be combined or integrated into SFS providing that the performance of the SFS is not adversely influenced and where necessary security grading should be considered.

5.7. Compatibility
Care should be taken during the selection of components to ensure all SFS components are compatible. Where any uncertainty arises the appropriate consultation should take place, e.g. with the SFD manufacturer, SFD supplier, a test house or another 3rd party.

5.8. Security grading
BS EN 50131-1 describes four security grades which should be considered when selecting components or equipment.

5.9. Environmental classification
BS EN 50131-1: describes four environmental classes, which should be determined by the environmental conditions in which the product/component is expected to operate.

5.10. Inadvertent or accidental activations
It is recommended that care should be taken by SFS designers, installation and maintenance companies, and users, to minimize inadvertent or accidental activations when installed and operational.

Note: *attention is drawn to BS EN 50131-8:2019, clause 7.9.*

5.11. Consultation
The design of an SFS should be determined in consultation with the client (or their authorised representative) and should consider the client's operational requirements as well as the risk present. Other interested parties may need to be consulted, e.g. insurers, responders (e.g. police), fire and rescue services or neighbours.

6. SFS design

This section is intended to assist those responsible for designing a SFS solution with the objective of designing a SFS solution that:

- meets relevant standards,
- is suitable for the defined protected area,
- is relative to the security risk(s) present,
- will be resilient to power failure and inadvertent or accidental activations,
- will fulfil the operational requirements of the client, and;
- function in a reliable manner that does not harm people or cause damage to property.

6.1. Operational requirements

The purpose of the SFS should be summarised in a document called operational requirements (OR).

The OR should clearly state what the client expects the functions of the SFS to do. The OR could be incorporated within the SFS design proposal, if so, this should be clearly stated within the document.

The development/design process encourages clear thinking about who will use the SFS, where and when it will be used and, in particular, the purpose of the SFS.

The OR may be produced by the client but is typically produced by the client in collaboration with the SFS designer, in any case it should not be produced without input from the client.

The later stages of development of the OR should involve those with the necessary skills to convert the OR statements into a SFS design proposal and where necessary, appropriate test procedures.

Note: *Without an OR there is no practical methodology to assess whether the SFS can fulfil its required purpose.*

6.1.1. Content of the operational requirements

The operational requirements should consist of the following parts detailed in 6.1.1.1 to 6.1.1.14.

6.1.1.1. Basic objective/functionalities

The following basic functions should be covered:

- Intended purpose(s) of the SFS including whether it is being utilised to protect against burglary and/or robbery.

  Note: *an example purpose is "to obscure the protected area from intruders or attackers in order to confront and deter individual(s) from harming people or property (including thefts, robberies or damage)".*

- Risk assessment, which informs the SFS design and selection of the equipment required to meet security grade of the IAS and/or HAS.

6.1.1.2. Define the insurer requirements for the SFS

The client may have been given specific insurance advice or recommendations that should be recorded in the OR.

6.1.1.3. Define the SFS protected area

The area(s) of the premises that is covered by the SFS in which obscuration in accordance with table 1 will be achieved.

Note: *The use of a simple plan might assist in describing the boundaries of a protected area more accurately, particularly when there are no solid boundaries.*

6.1.1.4. Define the SFS limitations

There may be limitations imposed by legislation, city rules or similar orders or possibly the proximity of neighbours. The client may require area(s) that should not be covered by the SFS.

6.1.1.5. Define the sequence of events required to activate the SFS

Define the sequence of events that need to be satisfied for the SFS to be activated effectively in the

protected area. Including when the SFS will be unavailable for activation, e.g. when the IAS is unset, or other criteria required by the client.

Consideration should be given to whether activation of the SFS should only be from a confirmed alarm. A confirmed alarm may be determined by:
a) the IAS and/or HAS as a result of two independent detectors activating within a defined time period;
b) the ARC (via the IAS and/or HAS) as a result of audio evidence; or
c) the ARC (via the IAS and/or HAS) as a result of visual evidence.

Note 1: *This may require a statement to specifically outline what does not cause an activation.*

Note 2: *This could mean that the process for how confirmed technology for IAS and/or HAS is implemented may need to be defined.*

6.1.1.6. Define the SFS performance requirements in relation to the protected area

The performance characteristics of the SFS in the protected area should meet the OR and at least the performance requirements as shown in table 1 below. This should be defined in the OR.

Table 1 – SFS performance requirements in the protected area by I&HAS grade

Performance	Activated by	Grade 1	Grade 2	Grade 3	Grade 4
Reduction of visibility to 1 m* (in seconds) Anti-raid	HAS	10 s	10 s	10 s	10 s
Reduction of visibility to 1 m* (in seconds) Anti-burglary	IAS	180 s	120 s	60 s	30 s
Maintaining obscuration to 1 m* for at least (in minutes) (see 6.1.1.7)	IAS and/or HAS	5 m	10 m	15 m	20 m
Timed from when the SFS receives the trigger input and not from when fog ejection starts.* ***Note:* *The trigger input is not always the same time as the activation of the IAS and/or HAS, for example, one of the failsafe measures that is commonly used against false activation on IAS is to use hold-off detection. In this instance, the IAS may have been activated but the SFS will not activate until the corresponding hold-off detection separately confirms movement in the protected area providing the trigger through to the SFS, this is also the point at which the time referred to in table 1 starts.*					

6.1.1.7. Maintaining obscuration

Depending on circumstances, the client may want to maintain obscuration for longer or shorter times than table 1, where longer times are required, this should be included in the OR as a client requirement and in the SFS design proposal.

Note: *where longer obscuration maintenance times are required, alternative or additional equipment may need to be considered in the design of the SFS.*

Shorter obscuration maintaining times are acceptable when the response time of the first responders is shorter than the 'maintaining obscuration' times in table 1.

Note: *For example there could be on-site security staff able to respond promptly, maintaining obscuration in those circumstances could hamper the response and the outcome.*

Where the police are likely to be the first responders, then the obscuration maintaining times in table 1 should be followed.

6.1.1.8. Conditions in the protected area(s)

Define the environmental conditions which may be significant in terms of the SFS design (e.g. ventilation, doors, windows, lighting, VSS, entry/exit routes, local or in-house security).

6.1.1.9. Resilience

Define the ability of the SFS to continue operating despite the existence of adverse circumstances (e.g. ability to continue operating during unexpected loss of power for a significant or defined length of time or blocking (or obstruction) of the ejection nozzle(s)).

***Note**: BS EN 50131-8 states that for a minimum period of one hour after mains failure the SFD shall be capable of a single fog ejection, it is expected that this is the minimum standby time of an SFS. However, depending on risk and the client's operational requirements this may not be sufficient to mitigate the risk, therefore careful consideration of resilience is necessary, the outcome may require more than is stated in BS EN 50131-8.*

6.1.1.10. Routine activity required to maintain resilience

Define the normal activity that is required to maintain the resilience of the installed SFS, (e.g. the client responsibilities for the day-to-day operation of the SFS).

Also define the level of maintenance required to ensure that the SFS continues to meet the SFS performance requirements (e.g. frequency of routine maintenance visits, maintenance activities covered at each visit, emergency call out cover required).

6.1.1.11. Operational response

Where the effectiveness of the SFS solution relies upon a rapid operational response, the following response actions should be defined:

- Define who would be responsible for the response (e.g. in-house security personnel, employees, key holder or guarding service)
- Define the target times for each response (e.g. in-house security personnel to attend scene within 3 minutes of SFS activation).

6.1.1.12. Client training

Define the training required for each role involved in the management and operation of the SFS.

***Note**: All stakeholder roles should be considered, e.g. those who may only be responding, part time staff, cleaners, neighbours.*

6.1.1.13. Visual and/or audible indications

Define any visual and/or audible indications that might be required in the protected premises or protected area on activation of the SFS.

6.1.1.14. List of any other special factors not covered by the above

Where the operational requirement (OR) cannot be met with current technology or resources it should be noted in the SFS design proposal.

6.2. Location risk survey

A written risk assessment should be produced, ideally based on a visit to the premises to carry out a location risk survey and should consider the following.

***Note:** it is preferred that a location risk survey is carried out based on a physical visit to the premises, however, this is not always practical or possible, therefore a location risk survey may be conducted either from information provided by the client or possibly remotely.*

a. The purpose of the SFS, i.e. is the SFS expected to confront and deter robbers or burglars. The SFS could be designed for hold-up scenarios (i.e. the protected area is occupied) or impede intruders (i.e. the protected area is unoccupied), or both.

b. Determine that the existing IAS and/or HAS is appropriate to interact with the SFS.

c. Identify other systems that might be impacted by the SFS:

- It should be verified that the detection utilised by the IAS and/or HAS is appropriate to ensure that the SFS performance requirements can be achieved.
  ***Note:** Does the IAS and/or HAS have detection of appropriate technology and location to enable it to be effectively used to trigger the SFS?*
- Consider that VSS may not be able to achieve clear images in the protected area during a SFS activation.

- Consider electrically activated locks on entry/exit routes that risk creating a mantrap scenario.
- Consider fire alarms, would the SFS activation create an unwanted fire alarm.

d. Identify other systems that might have an impact on the SFS:
- Consider ventilation, this could extract the security fog, delaying obscuration.
- Consider open doors or windows allowing the security fog to escape too quickly.

e. The location risk survey should be signed off by a competent person (i.e. the person responsible for the design).

6.3. SFS design considerations

6.3.1. General

At appropriate stages during the design process, checks should be made to ensure that the proposed design will meet the OR and the recommendations of this code of practice.

The outcome of the location risk survey and the OR should be used to inform any design decisions.

Any risks or impacts identified by the location risk survey should be addressed by the SFS design.

Any risks or impacts identified by the location risk survey that cannot be addressed by the design should be agreed with client and recorded in the SFS design proposal.

Note: *it is advisable that risks and impacts are addressed either by the designer or the client, as this could directly impact on the effectiveness of the SFS.*

Where the OR cannot be achieved by the design (e.g. technology or resources are not available), this should be agreed with client and recorded in the SFS design proposal.

Consider where there is an operational response included, does the design allow for those responding to enter the protected area safely, and cover any training requirements on how to achieve this.

Consideration should be given to the location of equipment to minimise the risk of inadvertent or accidental activation under normal IAS entry/exit procedures by the user.

6.3.2. Protected area is unoccupied (anti-burglary performance activation by an IAS)

The SFS design should include how the SFS would interact with the IAS, including the sequence of events that would need to be satisfied to activate the SFS.

6.3.3. Protected area is occupied (anti-raid performance activated by a HAS)

The SFS design should include how the SFS would interact with the HAS, including the sequence of events that would need to be satisfied to activate the SFS.

Note: *Attention is drawn to table 1 that requires an enhanced performance when used in an anti-raid environment.*

The design should avoid mantrap situations occurring, i.e. opening electrically activated locks on entry/exit routes when the SFS has been activated.

Consideration should be given to activating the SFS using body-worn HD or fobs.

Signage should be located in prominent positions in areas affected by the SFS, informing all persons that there is a SFS and the action to take during and following an activation. These actions should be site specific.

There should be an audible warning, which operates concurrently with the activation of the SFS which contains the same information as the signage.

6.3.4. Multi-occupancy

In multi-occupancy buildings or very large sites with internally protected areas the SFS should be installed so as to contain the fog within the protected area(s) as far as practicable so as not to infringe on to public areas or open areas except for SFS which are activated by the use of a HAS. For this type of building or site

consideration should be given to an audible warning of the activation of an SFS (e.g. a voice alert).

6.3.5. Selection of equipment

Equipment should be selected and located based on SFS performance requirements to meet the OR and security grade as described in table 1. Refer to 5.5 for recommendations for installations.

6.4. SFS design proposal

The SFS design proposal is the documented design (or specification) of the SFS and should contain the information or detail required to confirm that the proposed design will meet the OR and the recommendations of this code of practice.

The SFS design proposal should contain the following information:

- A statement of compliance, i.e. what standards or codes of practice does the SFS design meet. This should include a statement of compliance to this code of practice as well as any product compliance statements (e.g. SFD compliance with BS EN 50131-8)
- The security grade and environmental class of the products / components used in the SFS design.
- Clearly identify the location of the designated protected area, this should include a plan showing the layout of the protected area and the proposed location of the SFD(s) and associated components.
- The means of interconnection between components or the SFD(s) and the IAS and/or HAS.
- Define the method used to interact or interface with other systems including any compatibility requirements.
- How will the SFS be activated (i.e. the sequence of events (or triggers) that cause an activation).
- The expected performance criteria based on the SFD equipment specified.
- Justification of any risks or impacts identified at the location survey that have not been addressed by the design.
- Justification where the OR cannot be achieved by the design.
- Details of the purpose and location of any other equipment included in the SFS design.
- Where an operational response is expected, then detail the processes for those responding to enter the protected area safely.
- Any client responsibilities.
- Any training that will be provided.

The SFS design proposal should be signed off by a competent person (i.e. the person responsible for the design) and agreed with the client (or authorised representative) prior to being installed.

7. Installation planning

This section is intended to assist those responsible for installation planning by providing processes and guidance to assess the SFS design proposal, prior to installation, against the practical site specific challenges of installing the SFS in accordance with the SFS design, operational requirements, relevant standards and this code of practice.

Prior to commencing the implementation of the SFS design the following should be considered.

7.1. Pre-installation survey

To ensure the performance of the SFS is consistent with the SFS design proposal a pre-installation survey of the premises (particularly the protected area) should be carried out.

The objective of the pre-installation survey is to ensure that, as far as is practicable, the SFS to be installed will provide the performance specified in the SFS design proposal.

Note: *Depending on the size and complexity of the SFS the pre-installation survey may be carried out at the same time as the location risk survey but is typically carried out by a representative of the installing organisation prior to commencing installation of the SFS.*

7.2. Pre-installation survey considerations

The following should be considered as part of the pre-installation survey.

7.2.1. Manufacturer's recommendations

All equipment and components should be installed in accordance with the manufacturer's recommendations.

Where the installation of a component in accordance with the manufacturer's recommendations is not possible advice should be sought from the manufacturer or supplier and that advice should be followed.

7.2.2. Environmental considerations

All SFS equipment and components should be suitable for the environmental conditions in which they are required to operate.

7.2.3. Operation of SFS

The pre-installation survey should consider the operation of the SFS, particularly the operational procedures required to operate and manage the SFS effectively on a day-to-day basis.

7.2.4. Selection of components

The pre-installation survey should verify the selection of components specified in the SFS design proposal and should also confirm the proposed siting of the components is consistent with the performance requirements of the design and the manufacturers recommendations.

The siting of components to be operated by the client should be checked to ensure ease of access and operation (with minimal risk of inadvertent or accidental activation of the SFS).

7.2.5. Interconnections

Interconnection requirements should be considered, and the means specified in the SFS design proposal verified.

7.3. Amending the SFS design proposal

The pre-installation survey could identify issues which require the modification of the SFS design proposal. Any such changes at this stage should be agreed with the client and recorded.

8. SFS installation

This section is intended to assist those responsible for the SFS installation by providing processes and guidance that assures that the SFS installation is implemented in accordance with the SFS design proposal, relevant standards and this code of practice.
This clause will also describe processes that verify that the SFS installation has been carried out in accordance with the SFS design proposal and that the SFS is commissioned and handed over to the client/user in a way that allows the client to take responsibility for the day-to-day operation of the SFS.

8.1. Installation process

The SFS should be installed and configured in accordance with the SFS design proposal. Any deviations from the SFS design during the installation process should be agreed, in writing, with the client.

The SFS installation should be undertaken by individuals who have successfully undergone a formal training course on the SFD equipment being installed and have taken a written and practical test, and have proven their competence in installation and maintenance of that equipment.

***Note**: Attention is drawn to BS 7671, Requirements for Electrical Installations. IET Wiring Regulations.*

To comply with BS EN 50131-8 and this code of practice the SFS should be activated by the premises IAS and/or HAS (inclusive of any verification by an ARC, where appropriate).

***Note:** This could be triggered directly by the IAS and/or HAS, or where additional mitigation against false activations are required, then via the use of hold-off detection that is configured in a way that both triggers must be present simultaneously to activate the SFS.*

8.2. Initial inspection and test

The purpose of the initial inspection and testing is to demonstrate and document that the performance of the SFS as compared with:

- The SFS design proposal (including the OR and location risk survey)
- The manufacturer's recommendations

- The recommendations of BS EN 50131-8
- The recommendations of this code of practice
- The installation plan (where used)
- Other applicable requirements, e.g. BS 7671

Finally an operational test of the SFS should be carried out, including an activation, in the presence of the client. During this test, the fire alarm system should be put "on test" or inhibited from summoning fire and rescue services.

Note: *It is considered good practice to inform the local fire control room of any SFS activation testing.*

Any deviations from the SFS design proposal should be recorded for inclusion in the as fitted records and agreed in writing with the client.

8.3. Commissioning and handover

The organisation responsible for the installation and/or the client should inform the police (or other responders), the local fire and rescue services and the ARC of the proposed SFS prior to the SFS being commissioned. A record of notification to these organisations should be retained by the organisation responsible for the installation and/or client.

On satisfactory completion of the tests the SFS should be placed into operational mode.

Handover of the SFS to the user (or client) should be carried out by a person with the appropriate training and experience to manage the day-to-day operation of the SFS.

Clear and concise site specific operating instructions should be provided, these should include how the SFS is used and what actions users should take during and following an activation. These instructions should be provided to all users of the SFS including a full demonstration of the SFS.

All staff working in the premises that are likely to be present during an SFS activation or responding following an SFS activation should receive training by the organisation responsible for the commissioning and handover. The level of training given should be commensurate with the purpose and complexity of the SFS, but should as a minimum cover:

- What the SFS does and how it is intended to confront and deter robbers and/or intruders.
- How the SFS is activated, e.g. body worn HD etc.
- What to do when the SFS is activated in a robbery, e.g. activate the HD, drop to floor, crawl to predesignated 'safe area'.
- What to do following an activation, particularly if people are in the protected premises e.g. confirm intruders/robbers have left the premises, reassure members of the public, and await arrival of the responders (e.g. police).
- How to 'vent' the security fog (this should cover the protected premises specific arrangements).
- What to do if the SFS is activated inadvertently or accidentally.
- Attention should be drawn to any SFS warning signs.

Note 1*: The objective is to ensure that staff who are likely to be present during an activation or are expected to attend the protected area following an activation, understand how to do this safely, i.e. are staff equipped with the appropriate information and training to respond in an attack (or post attack) situation safely, even if their response is to leave the protected area.*

Note 2*: It is recommended that the client and user(s) or a person nominated by the client, be trained in basic 'user fault finding' and is familiarised with audible and visual warning generated by the SFS and displayed on the IAS and/or HAS.*

8.4. As fitted records

Documentation should be prepared, based upon the SFS design proposal, amended to reflect the SFS, as installed, including any changes found to be necessary during the installation process. The as fitted records should be an accurate record of the SFS including all information relating to the equipment or components installed, including locations. If warranted by the size and complexity of the SFS, the as fitted records should also include details of the types of cables used and their routing.

The as fitted records should be made available to maintenance and service personnel.

8.5. Statement of conformance

Any claim that the SFS has been installed in accordance with this code of practice should state that 'the SFS has been installed as per the as-fitted records, utilising SFD conforming to BS EN 50131-8'.

9. Documentation and records

This section describes the documentation which should be provided to the client on completion of the SFS installation that are required to confirm its conformance with this code of practice and relevant standards.

These documents are intended to provide a record of modifications to the SFS, based on the as fitted records, prepared when SFS installation was completed. The records are also intended to chronicle any corrective and preventive action carried out following inadvertent or accidental activation of the SFS and details of any repairs or modifications. The record should also include details of temporary fault conditions.

9.1. Documentation

The following documentation should be provided to the client and where applicable, the documentation should be prepared in accordance with EN 61082-1:

a) **As fitted records**
b) **SFS operating instructions** - operating instructions should be provided that are specific to the installed SFS and in sufficient detail to minimise the possibility of inadvertent or accidental activation of the SFS. Consideration should be given to dividing the instructions into sections:
   - actions required for daily operation
   - actions required to isolate an SFD, or the SFS.
   - actions required during an activation
   - actions required following an activation
   - actions required to maintain the SFS
c) **Installation** - the name, address and telephone number of the organisation responsible for the installation
d) **Maintenance and repair** - the name, address and telephone number of the organisation responsible for the maintenance and repair of the SFS, including details of how these may be contacted at all times
e) **Monitoring** - the name, address and telephone number of the ARC or other monitoring centre responsible for initiating a response
f) **Operational response** (where applicable) - the name, address and telephone number of the organisation responsible for attending the protected area following an activation (if not the police)
g) **Acceptance (or handover) certificate** – this should show client acceptance of the SFS, as installed
h) Statement of conformance.

The client or user should be requested to make these records available should the SFS require modification, repair or maintenance.

It is in the client's interest to keep these records up to date, therefore every effort should be taken to ensure that the client understands the importance of keeping these records up to date.

9.2. SFS record

The SFS record, over time, accumulates a history of the SFS, which will be used to assess the performance of the SFS at maintenance visits and assist in fault finding.

The record should include details of:
a) the time and date of any activations, including the cause of the activation.
b) any corrective or preventive action taken.
c) any modifications or additions the SFS.

The records should be supplied in a manner suitable for the long term preservation of the records.

The SFS records may be recorded in any medium providing it is kept up to date and easily accessible to the client and persons maintaining the SFS.

When storage of the SFS records is the responsibility of the client, then the client should be requested to make

the records accessible to those responsible for maintaining the system and also to ensure the records are securely stored when not in use.

10. Operation of the SFS

This section describes the responsibility of the client or user of the SFS to ensure it is maintained and reliably provides the level of performance intended by the SFS design when activated.

The client and/or user of the SFS and those responsible for the maintenance and servicing of the SFS should be made aware of their responsibility to:

a) ensure that only individuals trained to operate the SFS are allowed to control and maintain it and that it is managed in accordance with operational instructions and training provided.
b) ensure the protected area is used and maintained in a manner that does not inhibit or hamper the operation of the SFS.
c) report any defects in the SFS promptly to the responsible organisation (this is usually the organisation responsible for the maintenance of the SFS).
d) report any changes to the construction or to the use of the protected area which might adversely influence the performance of the SFS (this is usually reported to the organisation responsible for the maintenance of the SFS).
e) have available contact details for the organisation responsible for the maintenance and repair of the SFS.
f) have available contact details for who to contact in the event of an inadvertent or accidental activation of the SFS (e.g. ARC, police, fire alarm company, fire and rescue services).
g) provide any 3rd party contractors carrying out works in the vicinity of the SFS with the information they need to avoid disturbing the SFS. This could be the as fitted record (preferably a plan or schematic drawing), detailing equipment and component locations, wiring runs and venting arrangements.
h) maintain the relevant documents and records as described in this code of practice.

11. SFS maintenance

This section describes how SFS should be maintained and repaired to ensure that the SFS continues to provide the level of performance intended by the SFS design.

11.1. Maintenance Contract

It is the client's responsibility to arrange for the SFS to be properly maintained (inspected and serviced) and repaired, as necessary. A maintenance contract should be agreed between the client and a competent organisation for the maintenance and repair of the SFS.

The maintenance contract should specify:

a) the method of liaison necessary to provide access to the protected area and the premises where the protected area is located.
b) The number of routine maintenance visits that will take place per year.
c) What will be serviced and inspected.
d) The time within which a repair of the SFS will commence, following a request or report of a fault.

The name and telephone number of the organisation responsible for the maintenance and repair of the SFS and the alarm company (if different) should be prominently displayed near the IAS and/or HAS.

11.2. Maintenance and repair

11.2.1. Routine maintenance (routine inspection and testing)

To ensure the continued effective performance of the SFS and conformance with this code of practice the SFS should be periodically maintained (inspected and tested).

A routine maintenance schedule should be agreed, at the latest, by handover of the SFS to the user (or client). The maximum period between routine maintenance visits should be 12 months.

The user(s) of the SFS should be informed of those parts of the system that will be inoperable during the routine maintenance process.

Care should be taken to not inadvertently or accidentally activate the SFS or activate the HAS and generate a false call for responders (e.g. police) during inspection and testing process.

Any batteries should be replaced at intervals not exceeding the battery and equipment manufacturers recommendations.

The inspection and testing of the SFS should be undertaken by assessing the SFS against the as fitted records and this code of practice.

The inspection and testing of the SFD device should be undertaken according to its deployment context incorporating the manufacturer's instructions and the SFS design.

Any changes or alterations to the protected area that could impact on the performance of the SFS should be documented and brought to the attention of the client. This information should be used to inform any proposed changes to the design of the SFS. Any proposed changes to the design of the SFS due to physical changes or alterations to the protected area should be presented to the client at the earliest opportunity.

***Note**: it is understood that maintenance personnel may not be the same people who carry out the design alterations, therefore it is acceptable to inform the client that following the physical changes or alterations, the design may need to be assessed by a designer who will in turn contact the client directly in writing.*

A documented record of the routine maintenance should be completed and signed by the client or authorised representative (see Annex A for an example of a SFS servicing checklist).

All interventions during the routine maintenance, including inspection and testing, should be recorded in the SFS record, e.g. logbook.

Care should be taken that all equipment is properly reinstated following routine maintenance.

11.2.2. Repair

In the event of any indication of a malfunction or damage to any part of the SFS the client or user should immediately inform the organisation responsible for the maintenance and repair of the system, so that any necessary remedial action may be taken.

The time within which repair of the SFS will commence, following a fault(s) being reported to the organisation responsible for the maintenance and repair of the system, should be agreed and included in the maintenance contract.

Any repairs should be followed by an inspection and test as described in 11.2.1 above, to ensure that the SFS operates as designed.

The user(s) of the SFS should be informed of those parts of the system that will be inoperable during the repair process.

Care should be taken to not inadvertently or accidentally activate the SFS or generate a false call for responders (e.g. police) during the repair process.

A documented record of the repair (or any work undertaken on the SFS) should be completed and signed by the client or authorised representative.

All intervention during the repair work, including testing, should be recorded in the SFS record, e.g. logbook.

Care should be taken that all equipment is properly reinstated following the work.

12. Informative ANNEX A – Security fog systems (SFS) - servicing document

***Note**: The following is intended to be an example service document which is to be completed in conjunction with manufacturers' requirements for the SFS.*

It is a requirement that the SFS be subjected to the following checks at least once every 12 months and serviced in accordance with manufacturer's recommendations. Fluid levels must also be replenished after an activation as the SFS will be unable to perform a full activation capable of meeting the SFS design requirements.

	Action	Completed Y / N / NA	Comments
1	Have there been any changes at the installation site (particularly within the protected area) that affect the SFS and require action?		
2	Isolate SFS from IAS and/or HAS and if required, put IAS and/or HAS in service/test mode.		
3	Check the condition of the SFDs internal and external for wear & tear, damage, leakage etc.		
4	Are the connections to the IAS and/or HAS in order and operational?		
5	Check fluid bladder/bottle (container) content is sufficient. Recommended at least 2/3 full and at least sufficient for one activation of fog timer plus 20%		
6	Check back up battery operates satisfactorily and is likely to meet any power resilience requirements until the next service.		
7	Are activation warning devices (voice warning, strobes etc.) working correctly and audible and/or visual throughout the defined protected area?		
8	Where possible conduct live security fog ejection test activation and record results. Are the design requirements still being met?		
9	Ensure SFS and if required, IAS and/or HAS are returned to the normal (operational) modes.		
Further comments:			
Any client action(s) required:			
Certified checks carried out as above: Service Engineer Name, Signature & Date		Client Name, Signature & Date	

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