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Alarm systems - Intrusion and hold-up systems - Part 8: Security fog devices

Systèmes d'alarme - Systèmes d'alarme contre l'intrusion et les hold-up - Partie 8: Dispositifs générateurs de brouillard

Alarmanlagen - Einbruch- und Überfallmeldeanlagen - Teil 8: Nebelgeräte für Sicherungsanwendungen

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European foreword

This document (EN 50131-8:2019) has been prepared by CLC/TC 79 "Alarm systems".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-02-18
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2022-02-18

This document supersedes EN 50131-8:2009.

EN 50131-8:2019 includes the following significant technical changes with respect to EN 50131-8:2009:

— the standard no longer views a group of parts capable of generating fog as a system and instead considers it to be a device (possibly consisting of separate parts);

— all Security Fog Devices shall meet Environmental Class II;

— requirements for pressure vessels and energy efficiency measurement are now included.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

The EN 50131 series consists of the following parts, under the general title “*Alarm systems – Intrusion and hold-up systems*”:

— *Part 1: System requirements*

— *Part 2-2: Intrusion detectors – Passive infrared detectors*

— *Part 2-3: Requirements for microwave detectors*

— *Part 2-4: Requirements for combined passive infrared and microwave detectors*

— *Part 2-5: Requirements for combined passive infrared and ultrasonic detectors*

— *Part 2-6: Opening contacts (magnetic)*

— *Part 2-7-1: Intrusion detectors – Glass break detectors (acoustic)*

— *Part 2-7-2: Intrusion detectors – Glass break detectors (passive)*

— *Part 2-7-3: Intrusion detectors – Glass break detectors (active)*

— *Part 2-8: Intrusion detectors – Shock detectors*

— *Part 2-9: Intrusion detectors – Active infrared beam detectors*

— *Part 2-10: Intrusion detectors – Lock state contacts (magnetic)*

— *Part 2-11: Intrusion detectors – ALDDR*

— *Part 3: Control and indicating equipment*

— *Part 4: Warning devices*

— *Part 5-3: Requirements for interconnections equipment using radio frequency techniques*

— *Part 6: Power supplies*

— *Part 7: Application guidelines*

— *Part 8: Security fog devices*

— *Part 9: Alarm verification. Methods and principles*

— *Part 10: Application Specific Requirements for Supervised Premises Transceiver (SPT)*

— *Part 12: Methods and requirements for setting and unsetting of Intruder Alarm Systems (IAS)*

Introduction

Security Fog Devices are used both as a deterrent device for building security and as a crime reduction device for the protection of people.

This European Standard applies to a Security Fog Device that can be connected to an Intruder and Hold-up Alarm System (I&HAS). It can assist insurers, intruder alarm companies, customers and the police in understanding the principles and specifications of a Security Fog Device.

The purpose of a Security Fog Device is to reduce the visibility in a protected area by the use of a non-toxic fog in order to form a barrier between the criminal and the criminal's intended target.

This European Standard is not intended to cover standalone or mobile Security Fog Devices.

This European Standard has been designed to be flexible enough to encourage and encompass future developments in the field of Security Fog Devices.

1 Scope

This document specifies the requirements for Security Fog Devices as part of an I&HAS. It covers application and performance and also gives the necessary tests and trials to ensure efficiency and reliability of such obscuration devices.

This document also gives guidance on the criteria for design, installation, operation and maintenance of Security Fog Devices.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 286-1:1998, *Simple unfired pressure vessels designed to contain air or nitrogen — Part 1: Pressure vessels for general purposes*

EN 482, *Workplace exposure — General requirements for the performance of procedures for the measurement of chemical agents*

EN 50130-4, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems*

EN 50130-5:2011, *Alarm systems — Part 5: Environmental test methods*

EN 50131-1:2006, *Alarm systems — Intrusion and hold-up systems — Part 1: System requirements*

EN 50131-5-3, *Alarm systems — Intrusion systems — Part 5-3: Requirements for interconnections equipment using radio frequency techniques*

EN 50563:2011, *External a.c. - d.c. and a.c. - a.c. power supplies — Determination of no-load power and average efficiency of active modes*

EN 50564:2011, *Electrical and electronic household and office equipment — Measurement of low power consumption*

EN ISO 16000-1, *Indoor air — Part 1: General aspects of sampling strategy (ISO 16000-1)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50131-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
alarm verification
process to provide information additional to a notified alarm, which increases the probability that the alarm should be considered genuine

[SOURCE: EN 50518-3:2013]

3.1.2
idle mode
condition during which the equipment can promptly provide a primary function but is not doing so

Note 1 to entry: In the case of an SFD, it means a condition where the heater block (if any) and the heat accumulator (if any) are sufficiently warm to immediately eject in one-shot the fog quantity for which the SFD is designed.

[SOURCE: EN 62542 Edition 1, definition 5.3, modified by addition of the note to entry]

3.1.3
pressure vessel
housing designed and built to contain gases and/or liquids under pressure, including its direct attachments up to the coupling point connecting it to other equipment

Note 1 to entry: A vessel can be composed of more than one chamber.

3.1.4
protected area
designated space that the SFD is designed to restrict the visibility in when operated

3.1.5
obscuration
reduction in visibility as a result of fog from the activation of an SFD

3.1.6
security fog
artificially produced dense cloud of tiny, liquid droplets suspended in the atmosphere to achieve obscuration for protection purposes

3.1.7
security fog device
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

3.1.8
verified alarm
alarm considered genuine as a result of the use of alarm verification

3.2 Abbreviations

For the purposes of this document, the abbreviations given in EN 50131-1 and the following apply.

CLP	Classification, Labelling and Packaging
EMC	Electromagnetic compatibility
EPS	External Power Supply
IAS	Intruder Alarm System
I&HAS	Intruder and Hold-up Alarm System
IK	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts
IP	Ingress protection classification
LEA	Law Enforcement Authority (Police or governmental body that responds to activations from security systems)
SFD	Security Fog Device

4 Environmental requirements

4.1 Environmental classification

The Security Fog Device shall meet Environmental Class II (Indoor – General: environmental influences normally experienced indoors when the temperature is not well maintained) in accordance with EN 50131-1.

4.2 Environmental tests

For all operation the SFD shall not activate, generate tamper, fault or other signals or messages when subject to the specific range of environmental and EMC conditions and shall continue to function normally and within the safety specifications of its components.

The following Class II level environmental tests from EN 50130-5:2011 shall be applicable when testing the SFD:

— Clause 8: dry heat (operational);

— Clause 10: cold test (operational);

— Clause 14: damp heat, cyclic (operational);

— Clause 17: sulphur dioxide (SO2) (endurance);

— Clause 20: impact (operational);

— Clause 22: vibration sinusoidal (operational).

4.3 Immunity to electromagnetic interferences

Electromagnetic compatibility (immunity, operational) shall be assessed in accordance with EN 50130-4.

4.4 IP/IK rating

All parts and consumables of the SFD shall be housed in an enclosure meeting the following requirements:

— IP rating of IP20 or better;

— IK rating of IK08 or better.

5 Access levels

The access levels used in this standard shall be as stated in EN 50131-1:2006, 8.3.1.

6 Protection requirements

6.1 General

The SFD shall operate in a way that does not harm persons and other equipment in its vicinity.

6.2 Product safety

This standard does not specify product safety requirements. Such requirements can be found in relevant product safety standards.

NOTE 1 If the SFD falls under the Low Voltage Directive (2014/35/EU), electrical safety requirements can be found in EN 60065 or EN 60950-1.

NOTE 2 EN 60065 and EN 60950-1 are being replaced by EN 63268-1.

NOTE 3 The standards mentioned above cover both electrical and flammability hazards.

6.3 EMC

This standard does not specify EMC requirements. Such requirements can be found in relevant EMC standards.

NOTE 1 Emission limits and test methods are defined in the generic standard EN 61000-6-3.

NOTE 2 Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems are defined in EN 50130-4 (see also 4.3).

6.4 Non-toxicity

The manufacturer shall provide evidence that the consumable(s) and the emitted fog do not present a health and safety hazard to persons in normal use within the manufacturer’s specified consumable life-time.

The non-toxicity assessment shall be carried out by a laboratory accredited to EN ISO/IEC 17025 in the relevant field and shall include the following minimum elements:

— identification of the substances present in the consumable (fog liquid) and in the emitted fog;

— bibliographical research;

— sampling and analysis of all pollutants (gaseous, aerosol liquid and airborne particles) that contribute to the potential exposure as identified in the bibliographical research.

For that assessment, the laboratory shall use pollutant specific standards referenced in EN 482 or EN ISO 16000-1.

The non-toxicity assessment shall be repeated after each modification to the SFD or to the consumable that can affect the toxicity of the ejected/emitted fog. It is the manufacturer's responsibility to decide whether such a change in design or formulation has occurred.

6.5 Pressure vessels requirements

When SFD includes a pressure vessel as propelling gas container, the container and its accessories shall be such that:

— Maximum working pressure ≤ 30 bar (3 MPa)

— "Ps x V" ≤ 50 bar.litre (5 MPa.dm^3)

— Minimum working temperature ≤ -10 °C, but ≥ -50 °C

— Maximum working temperature ≥ 75 °C, but ≤ 300 °C for steel containers and ≤ 100 °C for aluminium containers

NOTE This means the pressurized container will be suitable for any working temperatures between -10 °C and +75 °C.

The container shall also meet the applicable requirements specified in EN 286-1.

In order to ensure adequate storage and transportation, the container shall be marked and labeled according to Clause 12 of EN 286-1:1998. This includes (but is not limited to):

— the maximum working pressure (PS in bar);

— the maximum working temperature (T_{max} in °C);

— the minimum working temperature (T_{min} in °C);

— the capacity of the vessel (V in litres);

— the name, registered trade name/mark and the address of the manufacturer;

— the type and serial or batch identification of the container.

6.6 Labels and warnings

The labelling of the SFD and its consumables for transportation, storage and handling shall meet the provisions of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

NOTE Safety Data Sheets (SDS) in GHS format also comply with the European "CLP regulation" EC No 1272/2008 and its amendments.

6.7 Energy efficiency

Energy consumption of the SFD in idle mode shall be measured and the results included in the documentation (see the testing procedure in Annex C).

The idle mode (as defined in 3.1.3) shall guarantee the generation of the maximum quantity of fog for which the SFD is designed, in one shot, and within a time not longer than the maximum time required in 7.1.

In addition, where the SFD is not powered directly from the mains, but via an external power supply (EPS), energy efficiency of the EPS shall be measured and documented in accordance with EN 50563:2011.

NOTE Energy efficiency data for the EPS can be available from the EPS manufacturer.

6.8 Warning signs

Each SFD shall be supplied with at least one piece of the warning sign described in Annex B.

Such warning signs are intended to be positioned at the normal entry point(s) of the building.

7 Functional requirements

7.1 Performance

The SFD shall meet the following minimum performance:

— Reduction of visibility to 1 m within 60 s in a minimum volume of 150 m^3;

— Maintenance of this obscuration for a period of 10 min in an un-vented room,

— An SFD in a 'Set' condition shall produce fog within one second after receiving an 'alarm' signal from the I&HAS;

The performance of the SFD shall be tested according to the procedure described in Annex A.

7.2 Operation during mains failure

For a minimum period of one hour after mains failure the SFD shall be capable of a single fog ejection with the level of performance defined in 7.1.

NOTE EN 50131-1 requires that the intruder and hold-up alarm systems are capable of operating without mains for longer periods than one hour. The SFD can generally not achieve compliance with these longer requirements due to the amount of energy used to power the SFD in idle mode.

7.3 Operation with mains only

A backup battery or alternative source of energy may be used to achieve the requirement of 7.2.

If a backup battery is used then a failure or absence of this battery, whilst the mains supply is available, shall not result in a reduction of fog generation performance as defined in 7.1.

7.4 Additional requirement for equipment using radio frequency interconnections

SFDs using radio frequency techniques shall meet the requirements of EN 50131-5-3 at the security grade of the I&HAS to which it is connected.

7.5 Tamper

All material parts and consumables of the SFD shall be inside one or more secure, tamper-resistant outer case(s). The opening of the outer case(s) of the SFD in idle mode shall cause an alarm condition (tamper message or signal).

The SFD shall not eject fog on an individual tamper signal or message if the I&HAS is in the unset condition.

7.6 SFD damage/neutralisation

The SFD shall not be damaged or neutralised by the security fog it is designed to produce.

7.7 Ejection nozzle

7.7.1 Nozzle protection

The ejection nozzle shall be protected to avoid any risk of injury with the SFD in idle mode.

7.7.2 Nozzle blocked or obstructed

Blocking or obstruction of the ejection nozzle shall not cause a hazard.

7.8 Fog eject limiter

The SFD shall incorporate a method for limiting the quantity of ejected fog to the specified density.

7.9 Stopping fog generation

The flow of consumable (supply of fog liquid to the heater block) shall be stopped within 3 s after reception of an I&HAS alarm cancellation signal (e.g. unsetting of the IAS).

A subsequent (and decreasing) draining of the heater block is regarded as being a stopped emission of fog ejection.

7.10 Heater block - temperature

The temperature of the heater block shall be fully monitored and controlled to ensure that it remains within manufacturer's parameters.

7.11 Heater block - overheating

The heater block shall be fitted with a thermal cut-out device to prevent overheating above the manufacturers' parameters.

Operation of the thermal cut-out shall require a reset by an authorised technician.

7.12 Isolation of the SFD

There shall be a means of isolating the SFD from the I&HAS to avoid a maintenance technician triggering the SFD during routine maintenance.

7.13 Fixings

Fixings/mountings shall be appropriate to prevent unauthorised removal or tamper.

7.14 Visual Indications

Through the setting/adjustment of hardware, firmware or software, the installer should have the possibility to disable the visual or other indicators on the security fog device from the general public (Access level 1).

7.15 Communication between the SFD and the I&HAS

7.15.1 General

When connected to an I&HAS, the SFD shall be capable of receiving and sending the information mentioned in 7.15.2.

If the SFD has no power the status of the outputs should be equivalent to a fault.

7.15.2 Minimum information to be communicated

a. INPUTS into the SFD:

i. set/unset,

ii. trigger,

iii. verified alarm condition. See 3.1.1 and 3.1.8.

b. OUTPUTS from the SFD:

i. SFD active (ejecting fog)

ii. tamper,

iii. low battery charge (if applicable),

iv. mains failure,

v. no consumables,

vi. incorrect temperature.

NOTE For outputs iii. to vi., a single signal or message may represent these conditions and other faults.

7.15.3 Non-critical faults

Non-critical faults such as low consumables, etc. may be transmitted as a separate signal or message.

7.15.4 Optional signals

Additional inputs/outputs may be provided (e.g. fire alarm inhibit).

7.16 Fault monitoring

The SFD shall be monitored so that a fault (see 7.15.2) will generate a signal or message, which shall be transmitted back to the host I&HAS.

7.17 Power failure

A power failure shall not lead to the triggering of the SFD.

If a power failure occurs, the SFD shall send a signal or message to the I&HAS within 2 min (see 7.15.2 b.iv), and where an ATS exists for remote notification at the I&HAS, immediately notification to the ARC shall occur.

8 Consumables

8.1 General

Requirements set in 8.2 and 8.3 apply to the consumables used in the SFD. Where relevant, requirements set in 6.4, 6.5 and 6.6 also apply.

8.2 Formulation

All formulations for all fluids and propellants shall be recorded and maintained by the original equipment manufacturer.

8.3 Traceability

All consumables shall be identifiable and traceable back to the SFD manufacturer.

9 Marking

The SFD shall be marked in accordance the Marking/Identification requirements of EN 50131-1 with the exception of the security grade marking. See also 6.5.

10 Documentation

The following minimum documentation shall be available:

— user instructions;

— installation instructions;

— maintenance instructions;

— a safety data sheet on all consumables;

— SFD warning signs;

— energy efficiency data (idle mode consumption in Watts).

11 Design, installation, operation and maintenance

Guidance information for installers and maintainers on the design, installation, operation and maintenance is shown in Annex D.

Annex A
(normative)

Performance tests

A.1 General

This annex states the test procedure for evaluating fog output and fog performance.

NOTE Since it is accepted that there is a direct relationship between the concentration of airborne fog chemical and visibility through the resulting fog, this has been selected as the most appropriate basis of quantifying fog output/performance of the EUT (Equipment Under Test).

The following tests shall be carried out in a fog test chamber as detailed below.

A.2 Fog test chamber

The fog test chamber shall be set up as detailed in Figure A.1.

The fog test chamber shall be, apart from as otherwise detailed in this document, an empty and windowless room or enclosure of volume (150 - 200) m^3, with a height to ceiling of (2,5 - 3) m. The volume of the test chamber shall be recorded as (v). The ratio of length to width shall be between 1:1 and 2:1.

The chamber shall be well lit (300 lx - 500 lx measured at 76 cm above the floor of the chamber).

Four distribution fans (as shown in Figure A.1) shall be mounted as the same level in the machine equal distance between the SFD and the corner of the room as indicated with the flow rate to give a homogenous distribution in the room. The fans shall be rated with a flow rate of between (0,15 - 0,3) m^3/s and the maximum fan tip speed shall not exceed 3 m/s.

NOTE The distribution fans are only used to calculate the amount of fog chemical used.

The staggered black cross markers (as per Figure A.2) shall be positioned at the observer's/operator's eye level, at 2 m and 3 m from the viewing position of the observer.

The staggered grey/black marker (as per Figure A.3) shall be positioned at the observer's/operator's eye level, at 1 m from the viewing position of the observer.

The chamber shall be at (20 - 22) ºC, with a relative humidity of (40 - 75) %.

The EUT shall be placed centrally within the chamber, so that the output nozzle is 1 m above floor level. If the EUT has multiple output nozzles, the centre of the group of nozzles shall be at 1 m above floor level.

It shall be possible to measure the weight of fog chemical in the EUT before and after each test activation to a resolution of a single gram. All necessary supply leads to the EUT shall be supported in such a way as to nullify their impact on the calculation of the amount of fog chemical used.

A.3 Test procedure

The procedure describer in this section shall be used to determine the chemical concentration in fog to achieve 1 m visibility (1 OD/m, 90 % obscuration), which is essentially a measure of the efficiency of the fog.

The purpose of the first part of the test is to determine the amount of fog chemical required by the EUT to achieve a uniform 1 m visibility through the fog in the test chamber.

For each activation of the EUT, the weight of chemical used per activation shall be recorded. For the sake of accuracy, and if the manufacturer of the EUT agrees, the flow rate through the EUT may be reduced so that the visibility target is achieved more progressively, since the purpose of this exercise is to determine the consumption of fog chemical (mg/m^3) to achieve 1 m visibility, not to equate fog output. Alternatively, the manufacturer of the EUT may elect to produce security fog in short bursts to achieve the same result.

The distribution fans shall be switched on within the chamber to ensure even fog distribution is achieved once the EUT is activated. The observer/operator within the chamber shall activate the EUT.

The observer/operator within the test room shall stop the EUT when the black element of the 1 m marker is not visible, and the weight of fog chemical used to achieve that visibility noted.

The test chamber shall then be cleared of fog and this procedure shall be repeated 2 times, and the mean average weight (zi) of fog chemical used calculated.

A.4 Activation test

The purpose of this part of the test is to enable specific performance figures to be attributed to individual EUT's.

The test chamber shall be clear of all visible fog. Distribution fans shall not be used in this test.

From start time (t0) the observer/operator shall activate the EUT until the weight of fog chemical used is as in A.2. Record this time as (t1).

The observer/operator shall then assume his viewing position.

Two minutes after (t1), the observer/operator shall confirm that the greyscale element of the 1 m marker is not visible. It is accepted that the black element of the 1 m marker may just be visible.

If the greyscale element of the 1 m marker is visible at this stage repeat procedure A.2, reducing the distance to the first marker by 0,1 m. Re-calculate the mean average weight accordingly (zi), and repeat test A.3 onwards (having re-sited the first marker back to 1 m). Continue to do this until the greyscale element of the 1 m marker is completely obscured (i.e. (zii) equals the 2nd mean average weight, (ziii) equals the 3rd mean average weight).

The observer/operator shall continue to view the marker line and shall note the time, in seconds, that the 2 m and 3 m marks become visible. Record these times as (t2) and (t3).

Repeat this test 2 times to achieve mean average times for (t1)/(t2)/(t3). These averaged times shall be referred to a (T1)/(T2)/(T3).

A.5 Fog output of EUT

The data from A.2 and A.3 are then used to calculate the fog output at 1 m fog visibility in m^3/s.

Fog concentration (c) to achieve 1 m visibility (mg/m^3)	$c = z$ [1] $\times$ 1 000/v
Fog chemical usage rate (r) (mg/s)	$r = z$ [1] $\times$ 1 000/T1
Fog output of EUT (m^3/s) at 1 m visibility	r/c

1) If it is necessary to re-calculate "z" as per A.3, then the re-calculated "zi", or "zii", etc. shall be used.

A.6 Fog persistency

The following results shows the rate of decay of obscuration.

Record the following:

Time for fog density to decay to 2 m (T2) – (T1) (s)

Time for fog density to decay to 3 m (T3) – (T1) (s)

A.7 Fog output over test periods

To account for the different methodologies of fog production, and to take into account rest periods that may apply to some SFD, each manufacturer shall calculate the total cumulative fog output (in m^3/s) that would be produced for the following periods after that first activation of the SFD.

Table A.1

Total fog output (m^3/s) at 1 m visibility		**Time following activation**
Manufacturer claim	**Test result**	
		15 s
		30 s
		1 min
		3 min
		5 min

A.8 Fog visibility/density table

For reference, visibility through the fog can be equated to optical density and obscuration as in Table A.2 below.

Table A.2

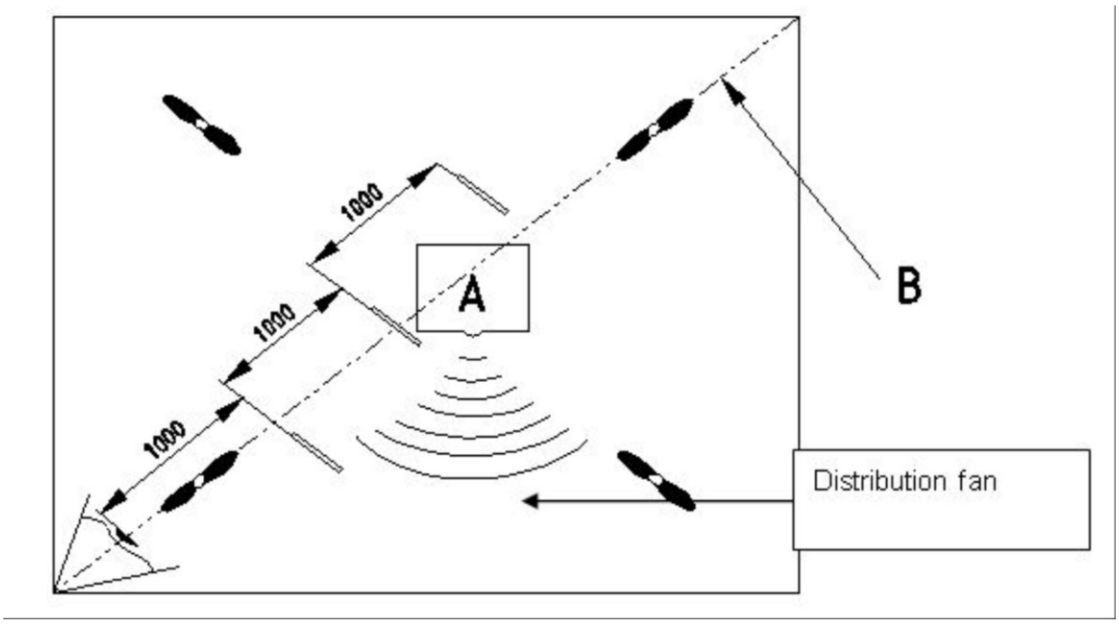
Visibility **m**	Optical density **1/m**	% Obscuration **% ob/m**
1	**1**	**90**
2	**0,5**	**68,37**
3	**0,333**	**53,58**

A.9 Performance data

Based on the test procedure detailed in this annex the following performance data relating to the EUT shall be stated in the test report:

Based on a test room (150 - 200) m^3		**Test results**
Fog output of EUT (m^3/s) at 1 m visibility	=	
Time (s) for fog density to decay to 2 m	=	
Time (s) for fog density to decay to 3 m	=	
Total fog output (m^3/s) at 1 m visibility after 15 s	=	
Total fog output (m^3/s) at 1 m visibility after 30 s	=	
Total fog output (m^3/s) at 1 m visibility after 1 min	=	
Total fog output (m^3/s) at 1 m visibility after 3 min	=	
Total fog output (m^3/s) at 1 m visibility after 5 min	=	
Fog concentrate usage to achieve 1 m visibility (mg/m^3)	=	

All dimensions in millimetres



Test chamber height: (2,50 - 3,0) m

Test chamber volume: (150 - 200) m^3

Lighting within chamber: (300 - 500) lx at 76 cm above floor

Relative humidity: (40 - 75) %

Test chamber temperature: (20 - 22) °C

Key

A = Equipment Under Test (EUT)

B = Visibility marker line

Figure A.1 — Test chamber

All dimensions in millimetres

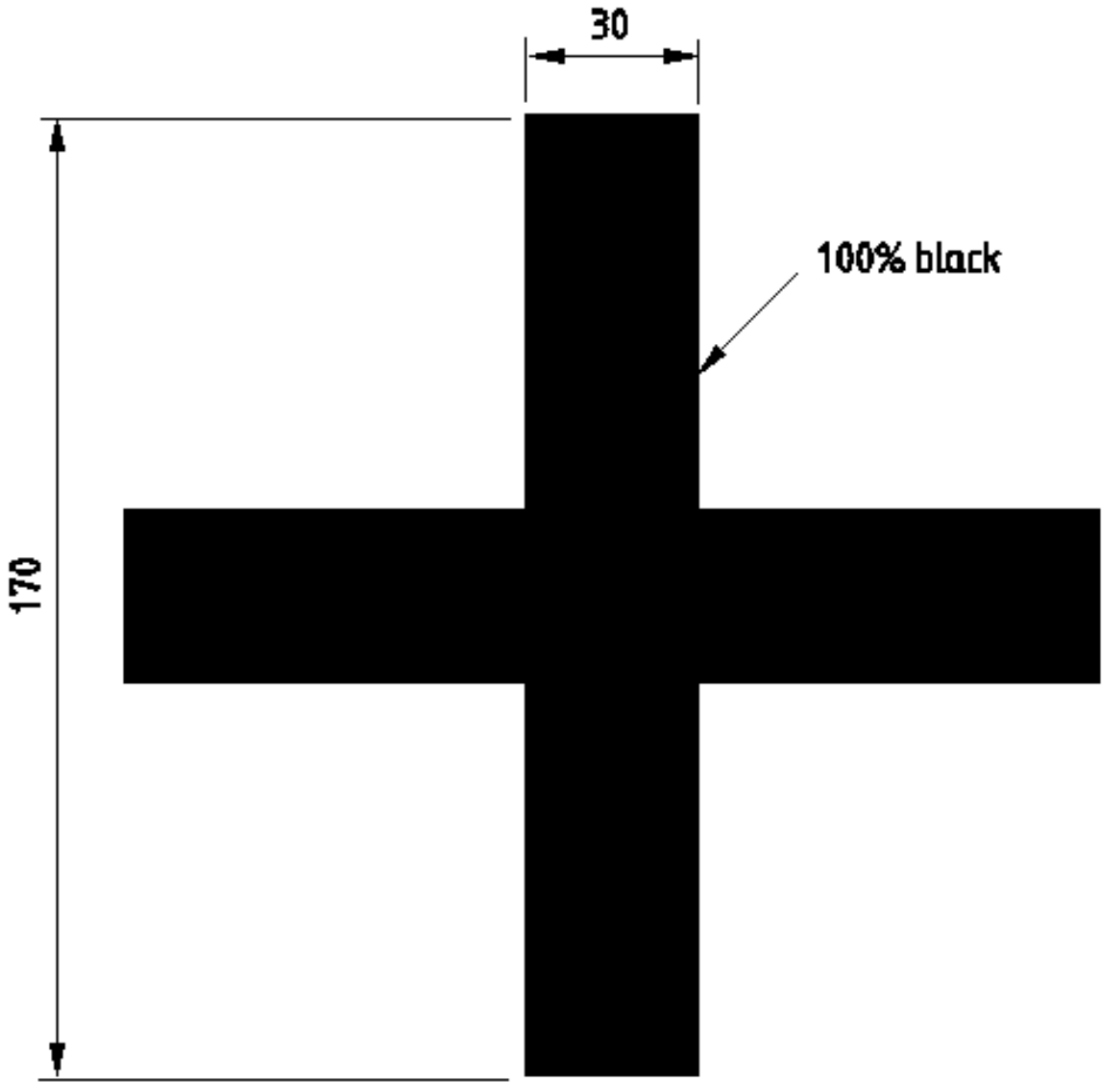


Figure A.2 — Target

All dimensions in millimetres

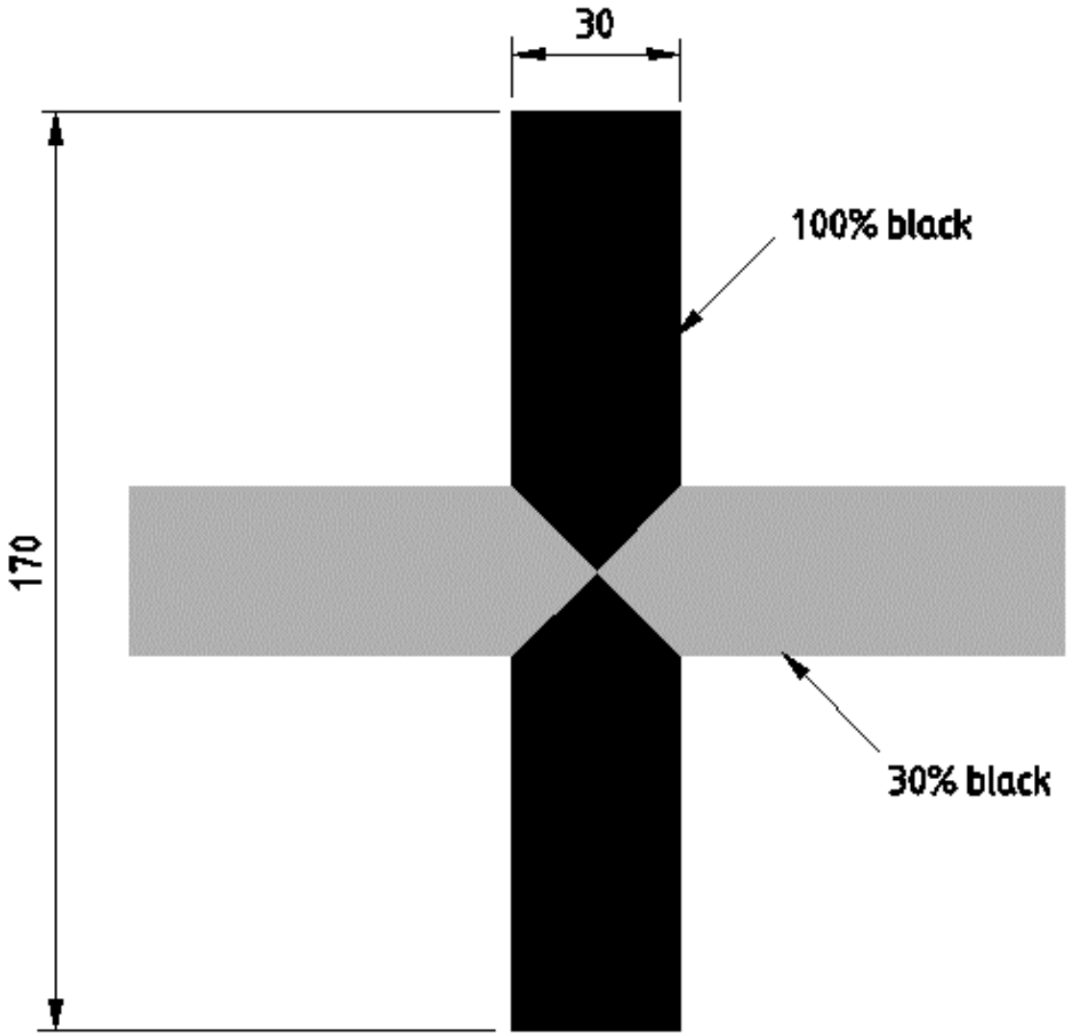


Figure A.3 — Partial target

Annex B
(normative)

SFD warning sign

B.1 Warning sign requirements

The warning sign shall meet the following requirements:

— Triangular shape

— Black pictogram on a yellow background with black edging

— Yellow part taking at least 50 % of the area of the sign.

An example is given in Figure B.1.

NOTE This warning sign complies with the European safety signs Directive 92/58/EEC and its amendments. The supplementary text underneath is optional.

Figure B.1 — SFD warning sign (example)

For a viewing distance of 7 m, the pictogram shall be at least 60 mm high, and the letters in the supplementary text shall not be less than 5 mm high. Refer to Table B.1 for pictogram and letter heights suitable for other viewing distances.

Table B.1 — How to calculate the size of sign you need

Height of signs and maximum viewing distances		
Maximum viewing distances m	**Minimum pictogram height** mm	**Recommended letter height supplementary text signs** mm
7	**60**	**5**
9	**80**	**7**
14	**120**	**10**
21	**180**	**15**
28	**240**	**20**

Annex C
(normative)

Measurement procedure for power in idle mode

C.1 Test room (EN 50564:2011, 4.2)

The tests shall be carried out in a room that has an air speed close to the product under test of ≤ 0,5 m/s. The ambient temperature shall be maintained at (23 ± 5) °C throughout the test.

C.2 Power supply (EN 50564:2011, 4.3)

Supply voltage and frequency shall meet the requirements specified in EN 50564:2011, 4.3.1.

Supply voltage waveform shall meet the requirements specified in EN 50564:2011, 4.3.2.

C.3 Measuring instruments (EN 50564:2011, 4.4)

Power measuring instruments shall meet the requirements specified in EN 50564:2011, 4.4. In particular, measurement uncertainty shall be determined according to EN 50564:2011, 4.4.1.

C.4 Preparation of unit under test (EN 50564:2011, 5.2)

The SFD shall be prepared and set up in accordance with the instructions for use.

Once a unit has been selected and is ready for testing, the following steps shall be followed and documented in the test report as applicable:

— remove the SFD from packaging (where applicable);

— read the instructions for use and configure the SFD in accordance with these instructions; where applicable, configure the SFD for the maximum fog generation;

— determine if the SFD contains any sensor (other than the internal temperature sensor) affecting the measurement result, e.g. an ambient light sensor; when relevant, test room specifications shall be adjusted so that the fog generation and the idle mode consumption of the SFD is maximized;

— determine if the SFD contains a battery and whether the SFD contains circuitry for recharging a rechargeable battery.

— identify any inputs through which fog generation can be triggered; make sure they are disconnected or disabled.

The influence of a rechargeable battery, which could possibly charge or discharge during the measurement shall be eliminated/reduced by either:

— removing or disconnecting the rechargeable battery (if possible);

— keeping the battery fully loaded during the test (if it cannot be removed or disconnected).

Additional power sources (including but not limited to network cable, alarm system connection, DC input or external battery backup system) shall be disconnected.

C.5 Test setup

EN 50564:2011 considers 2 cases: products connecting directly to the mains, and products connecting via an EPS; in both cases, the measurement is performed at the a.c. mains connector.

Depending on the way the SFD is powered, connection arrangement shown on Figure C.1 or C.2 shall apply.

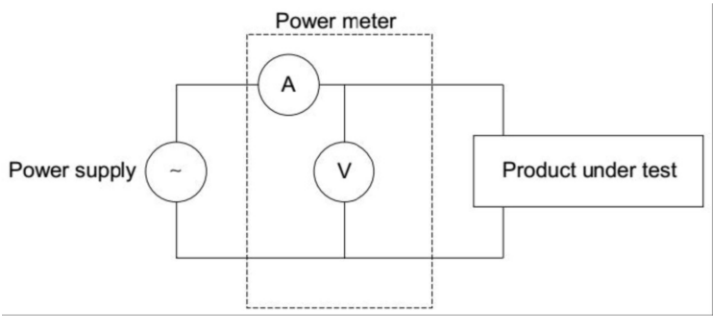


Figure C.1 — Connection arrangement for an SFD powered directly from the a.c. mains

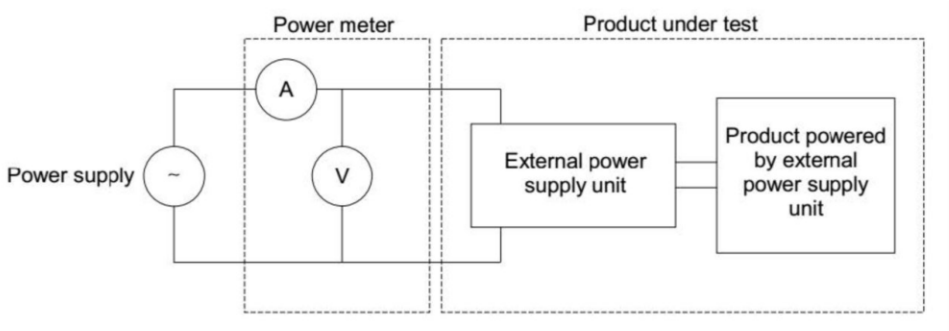


Figure C.2 — Connection arrangement for an SFD powered directly via an external power supply

C.6 Measurement (EN 50564:2011, 5.3.2)

Energy consumption of the SFD in idle mode shall be determined using the sampling method described in EN 50564:2011, 5.3.2, for non-cyclic power.

The unit under test shall be energized for a minimum time of 9 h, during which power, voltage and current will be recorded, at equal intervals of not more than 1 s. According to the procedure described in EN 50564:2011, 5.3.2, any data recorded during the first 3 h shall be discarded; data recorded during the next 6 h shall be used to verify stability and determine the average power to report.

C.7 Reporting

The test report shall include all relevant information mentioned in Clause 6 of EN 50564:2011.

User manual and product data sheets shall include the indication of the average power (in Watt) in idle mode, as determined in C.6.

When low power modes other than idle mode (and which cannot guarantee immediate generation of the maximum fog quantity for which the SFD is designed) are documented, such documentation shall include the wording “NOT OPERATIONAL”).

Power values less than 10 W shall be rounded to the second decimal place. For power values greater than or equal to 10 W, at least three significant figures shall be reported.

Where applicable, the user manual and the product data sheets shall also include energy efficiency data for the EPS, in accordance with EN 50563:2011.

Annex D
(informative)

Guidance on design, installation, operation and maintenance of the SFD

D.1 Risk assessment

The use and location of the SFD will be determined by the risk of intrusion assessment carried out and specific manufacturer instructions.

If an SFD is to be fitted to an I&HAS that is already installed then a full risk assessment should be carried out to ensure the I&HAS and SFD are integrated to give the best detection and coverage.

As part of the risk assessment consideration should be given to the time taken, after activation of the SFD, to obscure the protected areas to meet the owners/insurers requirements.

NOTE Obscuration is maximum visibility in metres.

Consideration should be given to providing visual and/or audible indications in the premises on activation by the SFD.

D.2 General notification

The installer and/or owner should inform the LEA, the local fire authority and ARC of the installation prior to the SFD being commissioned. A record of notification to these organisations should be kept by the installer and/or owner.

D.3 Verified alarm triggering

For SFD triggered by an intrusion alarm consideration should be given to whether this should be caused only by a verified alarm condition. See 3.1.1 and 3.1.8.

D.4 Multi-occupancy

In multi-occupancy buildings or very large sites with internally protected areas the SFD 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 SFDs which are activated by the use of a hold-up alarm system.

For this type of building or site it is recommended that, on alarm activation, an audible warning of the presence of a SFD be given.

D.5 Man trap – building unoccupied

The SFD should not be configured to form a “man trap”, i.e. it should not be the intention to deliberately trap persons or prevent escape.

D.6 Hold-up – Building occupied

When a SFD is used in a hold-up situation the following should be considered:

a) the local fire authority and the LEA should be informed that a hold-up alarm system has a SFD installed;

b) there should be a full risk assessment carried out on the location and use of a SFD in the hold-up situation;

c) the SFD should be placed so that the fog generated moves from the target area to the exit area;

d) there should be signage (as per European safety signs Directive 92/58/EEC) in the premises informing all persons that there is a SFD installed and the action to take if the security fog device is activated. (e.g. that the SFD has operated and the LEA is attending);

e) there should be a voice module, which operates concurrently with the activation of the SFD which contains the same message as the signage (e.g. that the SFD has operated and the LEA is attending);

f) the staff should be fully trained in the use of the SFD with the hold-up alarm system.

D.7 Installed SFD test

A full SFD test should be carried out to meet the specified performance and the results recorded. During the SFD test the fire alarm system should be put “on test” or inhibited.

D.8 Training

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

D.9 Manufacturers requirements

Testing and preventative maintenance should be undertaken according to manufacturer's instructions.

Bibliography

[1] DIRECTIVE 2014/27/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 amending Council Directives 92/58/EEC, 92/85/EEC, 94/33/EC, 98/24/EC and Directive 2004/37/EC of the European Parliament and of the Council, in order to align them to Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures

[2] DIRECTIVE 2014/35/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

[3] Globally Harmonized System of Classification and Labelling of Chemicals (GHS), revision 6 (2015)

[4] EN 689, *Workplace exposure — Measurement of exposure by inhalation to chemical agents — Strategy for testing compliance with occupational exposure limit values*

[5] EN 50518-3:2013, *Monitoring and alarm receiving centre — Part 3: Procedures and requirements for operation*

[6] EN 60065, *Audio, video and similar electronic apparatus — Safety requirements (IEC 60065)*

[7] EN 61000-6-3, *Electromagnetic compatibility (EMC) — Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3)*

[8] EN 62368-1:2014, *Audio/video, information and communication technology equipment — Part 1: Safety requirements (IEC 62368-1:2014, modified)*

[9] EN 62542:2013, *Environmental standardization for electrical and electronic products and systems — Glossary of terms (IEC 62542:2013)*