



K21045 SCP08/02
6 november 2025

Specific Certification Program Fire Protection Systems for Products

Object detection & activation of Solid Bound Compound
(SBC) Generators for total flooding

kiwa

Preface

This specific certification program has been accepted by the Kiwa Board of Experts Fire Safety, in which all relevant parties in the field of Fire Protection Systems are represented. The Board of Experts also supervises the certification activities and where necessary requires the evaluation guideline to be revised. All references to Board of Experts in this evaluation guideline pertain to the above mentioned Board of Experts.

This certification program will be used by Kiwa in conjunction with the Kiwa Regulations for Certification within the context of Certification Scheme K21045 “Fire Protection Systems”.

Kiwa Fire Safety & Security

Kiwa Nederland B.V.
Kiwa FSS Certification
Dwarsweg 10
5301 KT Zaltbommel

Tel. 088 998 51 00
NL.infocertification.fss@kiwa.com
www.kiwa.nl

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1. Introduction

1.1. General

This specific certification program includes all relevant requirements which are employed by Kiwa when dealing with specific applications.

This specific certification program is a first version and shall be used in context with product certification scheme K21045 “Fire Protection Systems”.

Fire Protection Systems (FPS) can be based on components being generators containing a Solid Bound Compound (SBC). This SBC is the base material for the extinguishing medium.

To activate the Fire Protection System should the SBC be expelled out of the generator in a physical form designed to extinguish or control the fire.

This first activation of the generator is an activation element that produces heat in short period to start up the process of the SBC in another physical composition.

The generator needs proper activation device according to EN15726-1 - Fixed firefighting systems - Condensed aerosol extinguishing systems - Part 1: Requirements and test methods for components. Paragraphs 4.4, 5.12 and 7.13 “Activation device” specify the requirements in general.

These generators are one of the elements for a Fire Protection System.

A Fire Protection System (FPS) needs a proper Fire Detection System (FDS) according to EN15726-1 - Fixed firefighting systems - Condensed aerosol extinguishing systems - Part 1: Requirements and test methods for components.

Normally are electrical activation devices used for Fire Protection Systems according to Fixed firefighting systems - Condensed aerosol extinguishing systems - Part 2: Design, installation and maintenance.

The Fire Protection System are equipped with control and indicating equipment according to EN12094-1 - Fixed firefighting systems - Components for gas extinguishing systems - Part 1: Requirements and test methods for electrical automatic control and delay devices” is specific designed for gas extinguishing systems.

This simple fire protection solution emphasizes only on object protection with total flooding that requires a simple method of fire detection and activation of the SBC generator(s).

In this specific certification program is made use of:

- the sprinkler method with a glass bulb;
- a simple electronic method employing a heat sensor or non-resettable line-type heat detector(s) .

Note.

This specifies certification program specifies the requirements for such a solution. The requirements are not detailed in the standard EN15726-1.

This specific certification program details the requirements for activation based on existing glass bulb technology used for sprinkler systems and simple electronic methods.

This principle is only to be used for object protection with total flooding based on SBC-generators of equipment in compartments normally unoccupied or unoccupiable areas with an emphasize on lost prevention and not direct on life safety.

The chosen application is less demanding, therefore the chosen technology is more simpler and has subsequently a lower cost. Which enables more use of object detection and suppression, reducing unnecessary loss of equipment. For unoccupiable areas is a time delay for activation not needed.

1.2. Field of application / scope(s)

- A. The functional and performance requirements for glass bulb technology used in conjunction with SBC - generators for total flooding applications.
- B. The functional and performance requirements for simple electronic methods technology used in conjunction with SBC -generators for total flooding applications with extra capabilities with primary and/or battery energy supply and for more severe conditions.

This principle is only to be used for object protection based on SBC -generators in an controlled chloride environment.

Based on the results of this test protocol in this specific certification program is additional listing possible.

1.3. Acceptance of test reports provided by the supplier

See TIC scheme K21045.

1.4. Quality declaration

See TIC scheme K21045.

2. Terms and definitions

See TIC scheme K21045.

2.1. Additional terms and definitions

2.1.1. *Glass bulb thermo activator*

Glass bulb thermos activator are thermally actuated release elements for automatic sprinklers, smoke vents, fire dampers and other release devices such as in this scope for SBC - generators. A hermetically sealed liquid in the glass bulbs expands with rising temperatures breaking the bulbs into small fragments at a predetermined release temperature.

Source; EN 12559-1.

2.1.2. *CIE*

Control & Indicating Equipment.

2.1.3. *SBC*

Solid Bound Compound.

2.1.4. *Bi-metallic sensor*

Bimetallic sensors, also known as bimetallic temperature sensors, are mechanical devices that measure temperature by utilizing the different expansion rates of two bonded metals. A simple method of heat detection.

2.1.5. *Non-resettable line-type heat detectors*

These heat detectors consist of a sensing element that uses an electrical sensor cable, which can be connected to a sensor control unit either directly or through an interface module (see EN54-28).

2.1.6. *Simple electronic methods*

In context of this specific certification program based on basic engineering principles to keep it simple, reliable and cost efficient to have a wider use of this fire protection.
The end user is not enabled to change the configuration.

2.1.7. *Extra capabilities*

In context of this specific certification program as the capability to switch on/of external devices when functionally needed for the objective of the device.

2.1.8. *Normal ambient temperature conditions*

Normal ambient temperature conditions typically refer to the temperature of the surrounding environment under standard conditions.

Normal Temperature and Pressure (NTP): Defined as 20°C (293.15 K) and 101.325 kPa.

Standard Ambient Temperature and Pressure (SATP): Defined as 25°C (298.15 K) and 100 kPa.

3. Procedure for granting a product certificate

See TIC scheme K21045.

4. Setup of this specific certification program

4.1. General

This chapter contains the setup for the specification certification program.

For the performance of its certification work, Kiwa is bound to the requirements as included in EN-ISO/IEC 17065 “Conformity assessment - Requirements for bodies certifying products, processes and services” and certification scheme K21045.

This program describes a test plan for:

- A. Glass bulb activators and its housing used in conjunction with the SBC-generator.
- B. The functional and performance requirements for simple electronic methods technology used in conjunction with SBC -generators with extra capabilities with primary and/or battery energy supply and for more severe conditions.

It describes the test requirements and/or laboratories to be used for the testing, identifies the tests to be performed and provides in minimal schedules for test activities.

5. Requirements and testing of the product

5.1. General

These chapters describe the requirements that the products, applied in the processes stated, shall meet. These requirements are part of the technical specification of the process, which is recorded in the product certificate for the Fire Protection System equipment.

Below table may guide as a quick reference to the applicability of Chapters on the different Scopes of Application.

Chapter	Scope	A (bulb)	B (simple electronics)	B (simple electronics with extended functionalities)
5.2 Housing		AISI304 / AISI316 Or EN60068-2-30variant 1 and fire resistance EN 15276-1 part 5.14. Or EN 61373 and EN 50155	PCB inside housing IEC 60529 >IP30	PCB inside housing IEC 60529 >IP56
5.3 Detection parts		EN12259-1or ISO 6182-1 or UL 199	EN54-28 and/or UL60730 and/or EN54-5	EN54-28 and/or UL60730 and/or EN54-5
5.4 Activation		EN15276-1 part 4.4, 5.12 and 7.13	EN15276-1 part 4.4, 5.12 and 7.13	EN15276-1 part 4.4, 5.12 and 7.13
5.5 EMC		If applicable EN / IEC 61000-6-4 EN 50130-4 / A1	EN / IEC 61000-6-4 EN 50130-4 / A1	EN / IEC 61000-6-4 EN 50130-4 / A1
5.6 Power Source		If applicable >1 year stand-alone manufacturers calculation	>1 year stand-alone manufacturers calculation	A.>1 year stand-alone manufacturers calculation OR B.2 power sources, primary 2001/95/EC and IEC 62368-1
5.7 Secondary Power source		Not applicable	Not applicable	>1 year stand-alone manufacturers calculation Or >12 hours back up Manufacturers calculation
5.8 Indications		Not applicable	Audio indication of battery or Visual inspection of battery according IEC 60204 10.3	Green = CIE functional Yellow = low voltage Yellow = fault condition Red = Battery dis-functional No LED = unit dis-functional
5.9 Extra Capabilities		If applicable IEC 60255-1 or UL508	If applicable IEC 60255-1 or UL508	VFC according IEC 60255-1 or UL508 Other in- outputs shall Monitoring and signal
5.10 Damp heat cycling		If applicable EN60068-2-30 variant 1	EN60068-2-30 variant 1	EN60068-2-30 variant 1
5.11 detection speed		as described	as described	as described
5.12 instructions		as described	as described	as described

Table 1; cross reference SCP08.

Notes.

1. In the setup of this component is it the intention that the manufacturer of this solution makes use of the approved activators of the certified SBC generators. If not shall the new type activator be tested and product certified according to the applicable standard such as EN15276-1.

2. The setup of the requirements is such that the life time of this component is the same as of the SBC generator. According to standard EN15726-1 is this 15 years.

5.2. Glass bulb product parts for scope A

The supplier of the SBC-generator shall supply a Fire Detection Solution according to the parts in standard EN 12259-1 applicable for glass bulbs solutions.

The heat rating of the glass bulb activator is the basis for the design of the solution in conjunction with the height of the protected compartment.

This is also possible based on the following standards:

ISO 6182-1 - Fire protection — Automatic sprinkler systems — Part 1: Requirements and test methods for sprinklers.

UL 199 - Standard for Automatic Sprinklers for Fire-Protection Service.

Note 3.

In the setup of this component is it the intention that the manufacturer of this solution makes use of certified glass bulbs. If not shall the glass bulb be tested and product certified according to the applicable standard.

5.3. Housing of the glass bulb activator for scope A

The supplier of the SBC-generator shall supply a Fire Detection Solution according to the parts in standard EN 12259-1 applicable for glass bulbs solutions.

The housing shall comply with the test according to annex K – Corrosive Tests of EN 12259-1/A1.

5.3.1. Housing of the glass bulb activator with Stainless steel

The parts of housing including spring and pen of the glass bulb activator connected to the SBC-generator shall be made of stainless steel.

The type AISI 304 (XCrNi18-10 / UNS S30400) application of these housing has a limited scope for an indoor application in non-aggressive environments.

The specification of the indoor environment are:

- Cl₂ should be equal or lower than 2 mg/L.
- Cl should be equal or lower than 100 mg/L.

The type AISI 316 (X5CrNiMo17-12-2 / UNS 31600) application of these housing has a limited scope for an indoor application in non-aggressive environments.

The specification of the indoor environment are:

- Cl₂ should be equal or lower than 3 mg/L.
- Cl should be equal or lower than 200 mg/L.

Notes.

4. In the setup of this component is stainless steel chosen as the basic material. The reason for this are its known mechanical characteristics such as:

- Resistance to fire A1 based on EN13501-1;
- Resistance to corrosion and mechanical strength based on standards and literature.

5. The spring in the housing shall be static and the construction with the pen and SBC activator shall be assessed and evaluated by the certification body for performance and endurance. The SBC activator shall be tested according to EN 15276-1 and certified according to scheme K21045 product scope E or scheme K23001.

5.4. Detection parts for simple electronic methods technology for scope B

The supplier of the SBC-generator shall supply a Fire Detection Solution based on approved elements. For the use of:

- Non-resettable line-type heat detectors according to standard EN54-28 and /or;
- Bi-Metallic sensor according to Safety Temperature-Indicating and -Regulating Equipment to standard UL 60730 and/or;
- Heat detectors - Point detectors according to standard EN54-5.

The characteristics of the detection elements are the basis for the design of the solution in conjunction with the height / dimensions of the protected compartment.

Note 6.

In the setup of this component is it the intention that the manufacturer of this solution makes use of certified parts. If not shall these parts be tested and product certified according to the applicable standard.

5.5. Housing & activation for simple electronic methods technology for scope B

The printed circuit board (PCB) of the control & indicating equipment (CIE) shall be installed in a box / housing. This housing shall comply with standard IEC 60529.

This is also applicable for the cable in- & outlets, buttons and indicating lights.

The minimal IP - classification should be IP-30. A higher IP classification is possible.

Note 7.

The provided IP classification shall express the intended use.

5.6. EMC resistance of the CIE for scope B

The control & indicating equipment shall be comply to standards:

- EN / IEC 61000-6-4 and;
- EN 50130-4 / A1.

5.7. Power source of the CIE for scope B

The control & indicating equipment shall have a one power source.

The power source shall be battery with a runtime of at least 1 year within a specified temperature range.

The manufacturer shall have design calculations and statistics on the power consumption in relation to the power source for activation in a time frame of minimal 1 year.

Note 8.

Because of safety objectives is changing of the battery yearly by a qualified technician mandatory.

5.7.1. Secondary power source (optional with requirements)

If needed for more server conditions is a secondary power supply possible.

The secondary source shall be connected to the 230 volt electrical grid and can be an external AC / DC power supply outside the housing of the CIE.

The secondary power source shall comply to the low voltage directive or if applicable the general product safety directive (2001/95/EC) covers consumer goods with a voltage below 75 V DC.

This based on standard IEC 62368-1.

The secondary power source can be installed in- or outside the housing of the control & indicating equipment.

In both cases shall this connection be indicated with a marking “not to be disconnected – fire protection system”.

5.8. Indications scope B

The CIE shall have a method to check the status of the device (battery) by light or audio indications.

Note 9.

IEC 60204 chapter 10.3 has following colour indications. These can be used for the light indications.

Colour	Meaning	Explanation	Action by operator
Red	Emergency	Hazardous condition.	Immediate action to deal with hazardous condition.
Yellow	Abnormal	Abnormal condition. Impending critical condition.	Monitoring and/or intervention.
Green	Normal	Normal condition.	Optional.

Table 2.

The LED shall emit a minimal luminous flux of 15 lumen at maximum 10mA or the LED is shall be visible at any angle within 22,5 ° from a line with its origin in the centre of the light emitting indicator and perpendicular to its mounting surface at a distance of 1 m at an ambient light intensity up to 15 lumen.

The engineering of the LED should be such that the energy consumption is in perspective with the objective of the device.

Note 10.

Because this simple CIE has no fault conditions on the connections to the detector(s) and SBC generator(s) shall the maintenance instruction of the simple electronic methods technology specify requirements in this context.

5.9. Extra capabilities of the CIE for scope B (optional with requirements)

The CIE shall have voltage-free relay contacts (normally open - NO / normally closed - NC) enabling the possibility of:

- switching of ventilating and;
- communicating with a fire alarm panel or an alarm transmission and fault warning routing equipment.

The specification of this electrical relay is IEC 60255-1 or UL508.

The choice for NO or NC contacts shall be laid down in the design of the CIE and the instructions.

5.10. Damp heat, cyclic (Operational) for scope B

The object of the test is to demonstrate the ability of the equipment to function correctly at high relative humidity (with condensation) which may occur for short periods in the anticipated service environment.

Use the test procedure described in EN 60068-2-30, using the variant 1 test cycle and controlled recovery conditions.

Before conditioning, subject the specimen to the functional test.

Mount the specimen and connect it to a suitable power supply if applicable.

The specimen shall not be supplied with power during the conditioning.

The specimen shall be in the quiescent condition.

Apply the following severity of conditioning:

- a) lower temperature: $(25 \pm 3) ^\circ\text{C}$;
- b) upper temperature $(55 \pm 2) ^\circ\text{C}$;
- c) relative humidity at lower temperature: $(93 \pm 3) \%$;
- d) relative humidity at upper temperature: $(93 \pm 3) \%$;
- e) number of cycles: 2.

Monitor the specimen during the conditioning period to detect any change in status.

During the last hour of the conditioning period, subject the specimen to the functional test.

After the recovery period, subject the specimen to the functional test and inspect it visually for mechanical damage both externally and internally.

During this test, the specimen shall not change status, except when such a change is a result of the functional test. When subjected to the functional test the specimen shall respond correctly.

5.11. Determination of the detection speed in relation to the height

Per generator type is the coverage determined according to EN15276-1 - Fixed firefighting systems - Condensed aerosol extinguishing systems - Part 1: Requirements and test methods for components.

This determined coverage is the bases for the determination of the detection speed based on EN 54-7 - Fire detection and fire alarm systems - Part 7: Smoke detectors - Point smoke detectors that operate using scattered light, transmitted light or ionization.

The flaming plastics (polyurethane) fire (TF4) test in annex I of this standard is the requirement for determination of the detection speed.

The performance requirement is that the activating element (glass bulb or electronic detector) has to be activated within 2 minutes in the compartment based on the coverage on the type generator.

This based on the pre-burning limit in the tests for class A fires in EN15276-1.

The test is adapted for this specific requirements for this application:

- with a starting catalysator of 40 ml n-heptane as defined in EN15276-1. This catalysator is poured direct for the activation in one the corners of the mat(s) that is used to light the fire with a lighter;
- the mats are positioned in the middle of the floor on the compartment;
- the compartment has an opening for ventilation during the test. This opening has an opening of length 15 cm and width of 10 cm and 40 cm above the internal floor;.
- a reference to the number of the mats in conjunction with the height of the compartment in relation to the coverage of the type generator. This is detailed in table 1;
- The thermocouples are situated on the following positions:
 - 3 thermocouples on top level at the ceiling of the compartment in different positions to control the temperature behaviour during this test;
 - 1 thermocouple on minus 10 cm and 1 thermocouple on minus 20 cm top level at the ceiling of the compartment.

This test has to be performed twice both with positive result.

The number of mats to be used during the test in relation to the height of the compartment is detailed below.

Height of the compartment in m	Number of mats
Less than 2,5	2 half
$> 2,5 \leq 4$	2
$> 4 \leq 6$	3
$> 6 \leq 9$	4
$> 9 \leq 12$	5

Table 3 – relation height compartment and number of mats (origin is NEN 2535)

Note 11.

According to the standard EN15276-2 are multi criteria fire detectors to be used with these type of SBC-generators.

The fire detection principle CO is most likely to be chosen based on the fire scenario.

In this solution is the fire detection principle heat chosen.

The generators are product certified based on a 2 minute pre-burning time.

This test is to determine if the detection method in conjunction with the height of the coverage is matching this 2 minutes limit.

Under normal conditions is a height of 2,5 or 4 meters maximum in this type of solutions.

In case of extra longitudinal situations such as non-occupiable cable shafts is a limit set.

5.12. Instructions

The manufacturer of the object detection & activation of SBC generators shall supply together with the equipment the specific requirements and instructions for the installation, the operation and the maintenance.

The expected life time is set on 15 years.

The instructions shall detail the disposal procedures for the components of the simple object fire protection solution after their end of use.

6. Factory Production Control Fire Protection Components

See TIC- scheme K21045.

6.1. Additional requirements for these components

The certified manufacturer / supplier has all the afore-mentioned certificates of these products available in a components file with an up-to-date overview.

This file shall be checked yearly by the certified supplier to verify if all certificates are still valid. The afore-mentioned components shall be checked visually for a valid product certificate and proper specification and marking on the packaging.

6.2. Standardized products with product control mark

These materials shall be checked yearly by the certified supplier for the declared specifications, based on a declaration by the supplier or manufacturer of the normalized products with product control mark, as well as the visual check of material and/or packaging specifications.

7. Inspection of Fire Protection Systems by Kiwa

See TIC- scheme K21045.

8. Marking

8.1. General

See TIC scheme K21045.

8.2. Certification mark

See TIC scheme K21045.

9. Requirements in respect of the quality system

See TIC scheme K21045.

10. Summary of tests and inspections

See TIC scheme K21045.

11. Agreements on the implementation of certification

See TIC scheme K21045.

12. Titles of standards

12.1. Public law rules

See TIC scheme K21045.

12.2. Standards / normative documents

See TIC scheme K21045.

Additional standards or standards in conjunction with this subject are shown below.

Number	Title	Version*
EN 15276-1	Fixed firefighting systems - Condensed aerosol extinguishing systems - Part 1: Requirements and test methods for components	2019
EN 15276-2	Fixed firefighting systems - Condensed aerosol extinguishing systems - Part 2: Design, installation and maintenance	2019
EN 10088-1	Stainless steels - Part 1: List of stainless steels	2014
EN 10088-2	Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes	2014
EN 10088-3	Stainless steels - Part 3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes	2014
ASTME 527 SAE J1086	Recommended Practice for Numbering Metals and Alloys	1990
EN 13501-1	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests	2019
EN 12094-1	Fixed firefighting systems - Components for gas extinguishing systems - Part 1: Requirements and test methods for electrical automatic control and delay devices” is specific designed for gas extinguishing systems.	2004
EN 12259-1/A1	Fixed firefighting systems - Components for sprinkler and water spray systems - Part 1: Sprinklers	1999/2001
EN 50130-4	Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems	
EN 54-5	Fire detection and fire alarm systems - Part 5: Heat detectors - Point heat detectors	2017
EN 54-7	Fire detection and fire alarm systems - Part 7: Smoke detectors - Point smoke detectors that operate using scattered light, transmitted light or ionization	2018
EN 54-28	Fire detection and fire alarm system - Part 28: Non-resettable line-type heat detectors	2016
EN 60068-2-30	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 + 12 h cycle)	2006
ISO 6182-1	Fire protection — Automatic sprinkler systems — Part 1: Requirements and test methods for sprinklers	2021
UL 199	Standard for Automatic Sprinklers for Fire-Protection Service	2022
UL508	Industrial Control Panels	2024

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UL60947-1	Low-Voltage Switchgear and Control gear - Part 1: General Rules	2022
UL 60730-1	Automatic Electrical Controls - Part 1: General Requirements	2021
UL 60730-2-9	Automatic Electrical Controls - Part 2-9: Particular Requirements for Temperature Sensing Controls	2021
IEC 60529	Degrees of protection provided by enclosures (IP Code)	1992 / C2:2016
IEC 60255-1	Measuring relays and protection equipment - Part 1: Common requirements	2022
IEC 62368-1	Audio/video, information and communication technology equipment - Part 1: Safety requirements	2020
IEC 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments	
IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	2016 / AMD1 2021

**) When no date of issue has been indicated, the latest version of the document is applicable for new systems.*

Kiwa shall inform the certificate holders about changes in version.

For design, installation and maintenance is the version of standard applicable set in the basic design.