

K23003/02

January 17th 2019

Definitive

Fire Protection Systems

Process Certification Scheme for fixed fire-extinguishing systems based on non-pressurized condensed aerosol generators



**Trust
Quality
Progress**

Preface

This certification guideline (Certification Scheme) has been accepted by the Kiwa Board of Experts "Fire Safety, wherein all the relevant parties in the field of Fire Safety are represented. These Boards of Experts also supervises the certification activities and where necessary require the certification guideline to be revised. All references to Board of Experts in this certification guideline pertain to the above mentioned Boards of Experts.

This certification guideline will be used by Kiwa in conjunction with the Kiwa-Regulation for Certification. This regulation details the method employed by Kiwa for conducting the necessary investigations prior to issuing the product certificate and the method of external control and during surveillance.

This certification guideline is to be assessed by the Board of Experts at least every 5 years.

Furthermore the NFPA 2010 (only the part about dry condensed aerosols), CEN/TC15276-2 and ISO15779 are the base in the Certification guideline for design, installation, acceptance and maintenance of fixed fire-extinguishing systems based on dry condensed aerosol.

The quality declaration based on this guideline is a process certificate for the supplier.

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The use of this certification guideline by third parties, for any purpose whatsoever, is only allowed after a written agreement is made with Kiwa to this end.

Validation

This certification guideline has been validated by the Director FSS of Kiwa on February 1th 2019

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1 Introduction

1.1 General

The requirements mentioned in this certification guideline are operated by Kiwa when handling a request or upkeep for this Kiwa Process Certificate (ISO/IEC 17065) and Kiwa Inspection Certificate (ISO/IEC 17020).

The granted declaration of quality is indicated as Kiwa product certificate for the delivery and maintenance of the fire extinguishing system. During execution of certification activities Kiwa is tied to the requirements recorded in the chapter "Requirements to certification bodies".

This certification guideline will be used by Kiwa in conjunction with the Kiwa-Regulation for Certification. This regulation details the method employed by Kiwa for conducting the necessary investigations prior to issuing the product certificate and the method of external control and during surveillance.

This certification guideline incorporates IMO regulations. It offers the certified supplier the possibility to operate worldwide based on the CEN-TR, NFPA, ISO and IMO regulations.

This certification guideline replaces the K23003/01 per January 1th, 2020.

1.2 Scope

The processes with regard to supplying of the basic- and detailed design, installation and the maintenance of fixed fire-extinguishing systems based on condensed dry aerosol for structures and compartments.

The requirements with regard to the architectural and technical conditions (see below) and therefor an effective extinguishment are part of this certification guideline. Furthermore the process also comprises the service and maintenance for the fire-extinguishing systems based on dry aerosol.

All delivery and maintenance activities by the certified company in this scope shall be carried out according to this certification guideline.

Assessment and inspection of a fixed fire-extinguishing systems based on condensed dry aerosol, supplied by a non-certified company will be performed according to chapter 7.

For onshore application in buildings are the standards CEN/TC15276-1: 2009, CEN/TC15276-2: 2009, ISO15779: 2011 and NFPA 2010: 2006 the minimal requirements in this certification guideline.

For offshore or maritime application MSC.1/Circ.1270 based on IMO-regulations is the minimal requirement.

This certification guideline has additional requirements on top of the mentioned standards based on the experience with this type of fire extinguishing systems in relation to quality assurance.

The fire extinguishing system operates on the following principles;

Volume protection

Systems designed to be installed in a volume protection shall be tested for the application selected and for the main fire protection objective/objectives.

Systems designed to be installed in a multiple hazard application shall be approved for all present hazards in the volume.

System generator distribution shall provide total volume protection, specified by the manufacturer's design and installation manual and shall consider relevant factors such as leakage through openings, ventilation rates, obstructions such as been tested during type- and system testing according to the certification guideline BRL-K23001.

Source protection

Systems designed to be installed in source protection shall be tested for the application selected and for the main fire protection objective/objectives.

This is also a volume protection principle. Within source protection a number of smaller volumes with a specific hazard inside are protected. The classification of the materials used for the source protection has to be such that this complies with the protection of the hazards inside.

In this application the fire alarm and controlling system have to monitor a number of volumes.

Special application

Systems designed to be installed in an special applications shall be tested for the associated application selected and for the main protection objective / objectives of the applications concerned.

Systems designed to be installed in multiple hazard object protection areas, where protection for individual objects is foreseen, shall be approved for all associated hazards present in the area.

The generator(s) distribution shall provide sufficient object coverage as specified by the manufacturers design and installation manual such as been tested during type and system testing according to the certification guideline K23001.

Note 1.

Object protection can be designed for compartmented or non-compartmented situations. For non-compartmented situations, the function of the system is controlling of the fire and not extinguishing. The level of controlling has to be determined during type and system testing including al environmental and scenario features.

Note 2.

For special applications a manual activation can be a requirement. For these situations the function of the system is controlling of the fire and not extinguishing. The level of controlling is depends on the responsible people in the organisation for activating the system. In these situations is the level of controlling not determined by the fire extinguishing system.

Fire Protection Principle	Objective	Requirements according ISO 15779	Notes
Fire extinguishing	<ul style="list-style-type: none">• Fire extinguishing• preventing the spread of the fire• Limiting and reducing the intensity of the fire at its seat and in relation to the surroundings	Fast response of fire detection system and a short actuation time in relation to: <ul style="list-style-type: none">• Class A fires• Class B fires	Maximum activation time(s) of the Aerosol Fire Extinguishing System shall follow from the pre- and free burning times from certification performance tests or against other technical standards.

Fire Protection Principle	Objective	Requirements according ISO 15779	Notes
	<ul style="list-style-type: none"> Protecting people Protecting buildings Protecting technological Equipment 		<p>Note: the discharge time of the applicable generator type shall also be involved.</p> <p>See chapter 5.2 and 5.3</p>
Fire control	<p>Limiting and reducing the intensity of the fire at its seat and in relation to the surroundings</p> <p>Preventing the spread of the fire</p> <p>Controlled burn-out of the section in which the fire is located.</p>	<p>Minimum density according Basic Design</p> <p>Note: Minimum density shall be not lower than the lowest recorded Certification Test density</p>	<p>Aerosol generators shall be activated intermittent to insure the minimum density to control the fire pending the arrival and deployment of the fire brigade</p>

Table 1 — Protection objectives in fire protection

1.2.1 Applicable standards onshore application

In the table 2 and table 2a below are the standards laid down applicable for this certification guideline . The ISO 15779 and NFPA 2010 have the requirements on the aerosol extinguishants itself incorporated and partly about the design, installation and maintenance of the systems. The CEN/TR 15276-2 is only about the design, installation and maintenance of the systems. All the paragraphs in the standards laid down are applicable in conjunction with this certification guideline .

Relationship to this K23003	Relationship to K23001		
Design, installation and maintenance of the system	Requirements on the aerosol extinguishants and components		
CEN/TR 15276-2; 2009	ISO 15779; 2011	NFPA 2010; 2006	CEN/TR 15276-1; 2009
1 Scope	1 Scope	1 Administration	1 Scope
2 Normative references	2 Normative references	2 Referenced Publications	2 Normative references
3 Terms and definitions	3 Terms and definitions	3 Definitions	3 Terms and definitions
4 Use and limitations 4.1 General 4.2 Extinguishants 4.2.1 General 4.2.2 Extinguishing mechanism	4 Use and limitations 4.1 General 4.2 Aerosol agent description 4.3 Application 4.4 Limitation of use 4.5 Electrostatic discharge	4 General 4.1 General Information 4.2 Use and Limitations 4.3 Environmental Factors	4 Component requirements 4.1 Condensed aerosol generator 4.2 Solid aerosol-forming compound 4.3 Cooling mechanism 4.4 Ignition device

Relationship to this K23003	Relationship to K23001		
Design, installation and maintenance of the system	Requirements on the aerosol extinguishants and components		
CEN/TR 15276-2; 2009	ISO 15779; 2011	NFPA 2010; 2006	CEN/TR 15276-1; 2009
4.3 Potentially explosive atmosphere 4.4 Temperature limitations	4.6 Potentially explosive atmosphere 4.7 Temperature limitations 4.8 Compatibility with other extinguishants 4.9 Environmental	4.4 Compatibility with Other Agents	4.4.1 General 4.4.2 Electrical ignition device 4.4.3 Thermal ignition device 4.4.4 Other methods of ignition device 4.5 End plate and housing 4.6 Extinguishants
5 Safety 5.1 Hazard to personnel 5.2 Safety precautions 5.2.1 General 5.2.2 Normally unoccupied areas 5.2.3 Unoccupiable areas 5.2.4 Installer's responsibility 5.2.5 User's responsibility 5.3 Electrical hazards 5.3.1 General 5.3.2 Electrical earthing 5.3.3 Electrostatic discharge	5 Safety 5.1 General 5.2 Toxicity 5.3 Reduced visibility 5.4 Turbulence 5.5 Thermal hazards 5.6 Safety precautions 5.7 Electrical hazards 5.8 Electrical earthing 5.9 Electrostatic discharge	5 Safety Requirements 5.1 Review Requirement 5.2 Hazards to Personnel 5.3 Electrical Clearances	5 Condensed aerosol generators requirements 5.1 General 5.2 Extinguishing factor 5.3 Agent distribution 5.4 Discharge time 5.5 Ambient temperature and humidity operation ranges 5.6 Service life 5.7 Shelf life and storage conditions 5.8 Corrosion 5.9 Vibration 5.10 Mechanical shock 5.11 Discharge temperature 5.11.1 General 5.11.2 Casing temperature 5.11.3 Aerosol flow temperature 5.12 Ignition device 5.12.1 General 5.12.2 Electrical ignition device 5.12.3 Thermal ignition device 5.13 Function reliability 5.14 Open fire conditions 5.15 Accessories 5.16 Documentation

Relationship to this K23003	Relationship to K23001		
Design, installation and maintenance of the system	Requirements on the aerosol extinguishants and components		
CEN/TR 15276-2; 2009	ISO 15779; 2011	NFPA 2010; 2006	CEN/TR 15276-1; 2009
6 System design	6 Extinguishant	6 Components	6 Marking
7 System installation 8 Detection, alarm and control systems	7 Specifications, plans and approvals 7.1 Specifications 7.2 Enclosure 7.3 Total flooding quantity 7.4 Design application density adjustment 7.5 Unit size and quantity of aerosol generators 7.6 Operating conditions 7.7 Duration of protection 7.8 System discharge 7.9 Detection, actuation and control systems	7.5 Unit size and quantity of aerosol generators 7.6 Operating conditions 7.7 Duration of protection 7.8 System discharge 7.9 Detection, actuation and control systems	7 Test methods
Annex A (normative) Working documents A.1 General A.2 Working documents	Annex A (normative) Documentation requirements Annex B (informative) Toxicity and visibility testing Annex C (normative) Test methods Annex D (normative) Extinguishing application density/Coverage test procedure		7 Test methods and Annex A (normative) Extinguishing factor/coverage test procedure

Table 2. Standards concerning this certification guideline

In addition to table 2 and related to this K23003		
CEN/TR 15276-2; 2009	ISO 15779; 2011	NFPA 2010; 2006

9 Commissioning and acceptance	8 Commissioning and acceptance	8 Approval of Installations
10 Inspection 11 Maintenance	9 Inspection, maintenance, testing and training	9 Inspection, Maintenance, Tests, Training and Safety

Table 2a. Standards concerning this certification guideline

1.2.2 **Applicable standards offshore application**

This table represents a cross reference between the onshore and offshore applications based on ISO 15779; 2011 and MSC.1/Circ.1270; 2008. For the cross reference between ISO 15779; 2011 and other applicable onshore standards see 1.2.1.

ISO 15779; 2011	MSC.1/Circ.1270; 2008
1 Scope	General 1 -2
2 Normative references	
3 Terms and definitions	Definitions 3 -7
4 Use and limitations 4.1 General 4.2 Aerosol agent description 4.3 Application 4.4 Limitation of use 4.5 Electrostatic discharge 4.6 Potentially explosive atmosphere 4.7 Temperature limitations 4.8 Compatibility with other extinguishants 4.9 Environmental	Principal requirements 8 – 25 Design concentration 8-11 Installation requirements 14 - 18
5 Safety 5.1 General 5.2 Toxicity 5.3 Reduced visibility 5.4 Turbulence 5.5 Thermal hazards 5.6 Safety precautions 5.7 Electrical hazards 5.8 Electrical earthing 5.9 Electrostatic discharge	Safety 12 – 14, 19 Thermal hazards 21 - 25
6 Extinguishant	Annex A
7 Specifications, plans and approvals #1	
8 Commissioning and acceptance	
9 Inspection, maintenance, testing and training	

Table 3; Standards concerning this certification guideline

1.2.3 **Suitability**

The certified supplier shall make known, in advance, for which types of fire the aerosol fire extinguishing system is suitable.

This shall be demonstrated as follows:

- A product certificate of Kiwa and according K23001.

For application superseding the scope of this certification guideline, additional testing shall be carried out according to the procedure in certification guideline K23001.

Dry aerosol components used in zones with flammable liquids or substances that could cause an explosive vapour or air mixture and for which an Ex - zoning has been determined, have to comply with CEN/TR 15276-1: 2009; chapter 7.18 "Explosive atmosphere test" of and ATEX-95.

1.2.4 Limitation of use

See paragraph 4 of CEN/TR 15276-2:2009, ISO 15779:2011 and chapter 5 of this guideline.

1.3 Acceptance of research reports provided by the manufacturer

If the supplier provides reports from test institutions or laboratories to prove that the products meet the requirements of this evaluation guideline, the supplier shall prove that these reports have been drawn up by an institution that complies with the applicable accreditation standards, namely:

- EN-ISO/IEC 17020 for inspection bodies;
- EN-ISO/IEC 17021-1 for certification bodies certifying systems;
- EN-ISO/IEC 17024 for certification bodies certifying persons;
- EN-ISO/IEC 17025 for laboratories;
- EN-ISO/IEC 17065 for certification bodies certifying products.

Remark:

This requirement is considered to be fulfilled when a certificate of accreditation can be shown, issued either by the Board of Accreditation (RvA) or by one of the institutions with which an agreement of mutual acceptance has been concluded by the RvA. The accreditation shall refer to the examinations as required in this evaluation guideline.

When no certificate of accreditation can be shown, Kiwa shall verify whether the accreditation standard is fulfilled.

1.4 Declaration of quality

Based on this certification guideline there are two types of declarations

1.4.1 Declaration for Certified supplier

The declaration of quality that is granted based on this certification guideline is denoted as Kiwa process certificate. A model of this declaration of quality is provided in Annex D of this Certification guideline.

1.4.2 Declaration for the fire-extinguishing system

The declaration of quality that is granted based on this certification guideline is denoted as Kiwa product certificate. A model of this declaration of quality is provided in the quality plan belonging to this Certification guideline.

2 Terminologie

2.1 General

In this certification guideline the following terms and definitions are applicable:

- Board of Experts: The Board of Experts "Fire Safety".
- Certification guideline: the agreements made within the Board of Experts on the subject of certification.
- Inspection tests: tests carried out after the certificate has been granted in order to ascertain whether the certified products continue to meet the requirements recorded in the Certification guideline.

Remark:

The test matrix contains a summary showing what tests Kiwa will carry out in the pre-certification stage and in the event of inspections as well as showing the frequency with which the inspection tests will be carried out.

- IQC scheme: a description of the quality inspections carried out by the supplier as part of his quality system.
- Pre-certification tests: tests in order to ascertain that all the requirements recorded in the Certification guideline are met.
- Product certificate: a document, in which Kiwa declares that a product may, on delivery, be deemed to comply with the product specification recorded in the product certificate.
- Product requirements: requirements made specific by means of measures or figures, focusing on (identifiable) characteristics of products and containing a limiting value to be achieved, which limiting value can be calculated or measured in an unequivocal manner.
- Supplier: the party that is responsible for ensuring that the products meet and continue to meet the requirements on which the certification is based.

2.2 Requirements

Functional requirements: essential requirements made upon the product, so that the product can be used safely by the user and is functional for its intended purpose.

Performance requirements: in measurements or figures detailed requirements that are specified to certain (functional) properties of the part of the building component (fire-extinguishing component) and that contain an obtainable limit value which can be calculated or measured unambiguously.

Product requirements: in measurements or figures detailed requirements that are specified to certain (identifiable) properties of products applied in the building component (fire-extinguishing component) and that contain an obtainable limit value which can be calculated or measured unambiguously.

Process requirements: concrete requirements which the process shall meet, if necessary including the relevant conditions and boundary conditions under which the process shall take place.

2.3 Terms and abbreviations

The following definitions are used in this certification guideline :

- Aerosol: colloid mixture of solid or liquid particles in a gaseous medium
- Activation mechanism: automatic or manual activation which leads to a physical outflow of the aerosol extinguishing agent.
- Audit: systematic and independent test for determining whether an activity in the field of quality and associated results corresponding with the planned

measures and whether these measures are implemented effectively and are suited for realisation of its purposes. The test should be focused on the output of the process. Practically the audit is aimed at organisational and management activities (software) that lead to securing the output of the process.

- Automatic: not manually controlled.
- Manual: controlled or operated by a person.
- Automatic /manual switch: Means to change the system from automatic to manual activation. Explanation: this can be done by means of a manual switch on the control panel or another unit or a blocking personnel entrance.
- Basic design: Basic design containing boundary conditions for the fire-extinguishing system (input specification basic design criteria for the fire extinguishing system based on and determined in the risk evaluation).
- Colloidal: the condition of substances that are finely dispersed in a liquid or gas, in which the particles are larger than a molecule and smaller than particles in suspension.
- Control device: device capable of tracking the sequence of events leading to activation.
- Authority having jurisdiction:
 - the authorities or principal; primarily the municipal board or its representative which demands and/or approves the application of the fire extinguishing system. Furthermore each other legal body can act as authority having jurisdiction such as fire insurance companies. These demanding parties have to determine the starting-points for the fire extinguishing system or
 - the authorisation granting authority; in most occasions the municipality or regional authorities, who will present it to a (regional) fire brigade for advice.
- Emergency plan: plan for how to act in case of calamities.
- EN: European standard.
- Fire compartment: part of one or more buildings intended as maximum expansion area.
- Fail Safe: a mechanism capable of returning to a safe state in case there is a failure or malfunction.
- Condensed aerosol generator: construction and parts like the activator and the packaging filled with dry solid extinguishing agent which ejects a dry aerosol (extinguishing medium) after activation with the purpose to extinguish the fire.
- Fire-extinguishing control and indicating equipment: central unit for control of the fire-extinguishing system according EN 12094-1 or combinations according EN 54-2 and EN 54-4 (control and indication equipment of an automatic fire detection and fire alarm system) and EN12094-1 as laid down in paragraph 4.1 (electrical automatic control and delay device).
- Fire extinguishing panel: central panel and/or supply unit. See also fire-extinguishing control and indicating equipment for standards and relation.
- Fire extinguishing system: system consisting of various components for extinguishing a fire, such as fire-extinguishing components, control cables and control centre and the functional boundary conditions as stated in the scope and which shall realise an integral safety concept. For a system in the high risk segment clear requirements shall be met for granting the installation certificate based on the test and/or inspection report by the certification body.
- Fire extinguishing system certificate: declaration by the installer, that the design, the fire-extinguishing system or the service meets the requirements in this certification guideline.
- Fire extinguishing mechanism (chemical): after ignition of the dry extinguishing agent it is ejected as dry aerosol consisting of finely dispersed particles (e.g. 40% of the mass) specifically based on alkaline metal salts and gases (e.g. 60% of the mass) mainly consisting of nitrogen, carbon dioxide and water vapour. The dry aerosol extinguishes on a chemical basis by interfering in the

chain reaction of the combustion process by binding of free radicals. The binding of free radicals prevents the free electrons in the outer shell of the substance from reacting with other substances, thus stopping the combustion process. Both actions mainly occur at the surface of the microscopically small particles in the dry aerosol. These particles are suspended in an inert gas. The smaller the particles, the more effective the mechanism functions.

- Fire load: fire load as mentioned in NEN 6090.
- High risk segment: based on the hazard to humans and/or hardware (capital goods variable or structural) the supplier, authorities or user can decide to a high risk segment. In this case is a minimal yearly inspection frequency by the certification body mandatory.
- Hold time: period of time during which an extinguishant is required to maintain at least the extinguishing application density to maintain even distribution throughout protected volume; the structural capability of a room to keep the density at the desired level during a certain time. See 4.5.1. and certification guideline K23001.
- Housing: construction in which the dry solid extinguishing agent is stored and from which the extinguishing agent is transported through the outflow openings.
- Inspection: activities like measuring, investigating, testing or estimating of 1 or more product characteristics and comparing those results with specified requirements in order to determine if characteristic compliance has been achieved. It specifically concerns the inspection of the fire-extinguishing system and associated boundary conditions. In practice the inspection is aimed at technical physical output of the process (hardware).
- Insurance company: person or organisation who is prepared to undertake the risk stated in the insurance policy for a certain fee (premium)
- IQC scheme: Internal Quality Control scheme.
- ISO: International Standard Organisation.
- Light industry function: Industry function concerning activities in which presence of human beings is of minor importance.
- NEN: Dutch Standard and Dutch Standardization Organisation
- NFPA: National Fire Protection Association.
- Normally unoccupied area: A building service equipment support area in which people are not expected to be present on a regular basis. Examples of such areas include interstitial spaces, crawl spaces, tunnels, attics and service vaults.
- Normally occupied area: An area that is normally occupied by personnel.
- Other usage functions: not further specified usage function concerning activities in which presence of human beings is of minor importance.
- Principal: owner of the installation
- Projecting: detailed design of a fire-extinguishing system, in which the installation is engineered based on the Basic design (Basic design).
- Reduced vision: when the dry aerosol generators are activated, vision is reduced during and after the outflow period; it could cause dangerous situations for people in the protected area as well as the area where it flow to in second instance. In all proposed applications of dry aerosol, sufficient protection shall be present for people near or about to enter the protected room. Examples: training for personnel present, warning signals, an alert before outflow and a system unlocking device. Ventilation provisions for after the fire should be present. See table 1.
- RIE: Risk Inventory and Evaluation
- Solid fire-extinguishing agent (SFEA): the solid form which by raise in temperature is transformed into an aerosol
- Supplier / installer: party responsible for the processes to be continuously meeting the requirements on which the certification is based, in this case the designing and installing party and the party supplying service / maintenance.
- Supply unit: unit suitable to activate the aerosol components.

- Suspension: liquid or gas containing another substance of floating microscopically small particles.
- Technical room: room for placement of equipment, necessary for a building's operation, at least including a meter room, an elevator room and a heating room. Can be expanded with various other rooms.
- Lock-off device: manual switching-off device which prevents an automatic electrical activation of the aerosol generator (see EN 12094-1).
 - Note: The active position of the device shall result in a fault message on the fire panel.
- Fire resistance: Resistance against fire drift and fire spread as stated in EN13501-2.

3 Procedure for granting the quality declaration

3.1 Pre certification tests

The pre certification-tests to be performed are based on the (product or/and process) requirements as included in this certification guideline including the test methods and contain, depending on the nature of the product (installation or system) to be certified:

- Type testing to determine whether the products (installation or system) comply with the product and/or functional requirements,
- Production Process Assessment
- Assessment of the quality system and the IQC-scheme,
- Assessment on the presence and functioning of the remaining procedure.

3.2 Granting the quality declaration

After finishing the pre-certification tests or the inspection, the results are presented to the person deciding on granting of certificate. This person evaluates the results and decides whether the certificate can be granted or additional data and/or tests are necessary.

4 Process requirements and determination methods

4.1 General

These chapters describe the (private) requirements the processes shall meet. These requirements will be part of the technical specification of the certified installer's process that is registered in the process certificate.

The process is detailed in the following process steps in accordance with EN 16763.

- 1) In process step 2.10 the minimal boundary conditions shall be covered.
- 2) If a authority having jurisdiction (insurance company, local authority and/or client) demands a inspection, this inspection shall be executed by the certification body.

4.2 Design

The design requirements shall be recorded in the basic design.

- The Basic design shall contain clear functional performance requirements for the fire-extinguishing system regarding effectivity and functionality, boundary conditions and any other project related criteria for fire protection by means of an aerosol fire-extinguishing system.
- The Basic design needs to be offered for verification to the authority having jurisdiction, insurance company and/or the client or owner of the system. During verification these parties can demand that an audit/inspection is necessary in case of a high risk situation. The authority having jurisdiction can demand local or public requirements to be applied to this type of systems or the system involved.
- The Basic design shall be verified by the parties involved and, if a licence is obligated, at least by the authority having jurisdiction .
 - Kiwa also makes an assessment of the Basic design.
- When the parties involved have authorised the system basis design, the next step is the detailed design of the fire-extinguishing system based on the validated basic design.
 - Kiwa also makes an assessment of the Detailed design.
- The certified installer shall validate the total design process.
 - See 4.1
- The total design process shall be realised in compliance with ISO9001 and this certification guideline.

Note that: A Basic design, not verified and validated by all parties involved, cannot be accepted and therefore the involved fire-extinguishing system cannot be accepted either.

4.3 Installation

Installation of a fire-extinguishing system based on dry aerosol shall be carried out by trained personnel according to this certification guideline . It shall be done based on K23003, on the manufacturer's instructions and on the design.

4.4 Putting into operation

The fire-extinguishing system based on dry aerosol shall be put into operation under responsibility of the certified supplier and by trained personnel and consists of all activities to make the system functional and operational in compliance with the basic design and the installation plan.

4.5 Acceptance

The certified supplier shall set up an Acceptance Report in which he declares that the fire-extinguishing system is operational and functions according to the basic design. Through documentation it shall be proved that all system's components and parts applied meet the requirements of quality and compatibility.

During acceptance the certified installer shall hand over the following documents to the client /owner and user:

The Acceptance Report which shall contain at least the following (revised) documents:

- Basic design
- Installation plan (function or cause & effect matrix, block diagram or process instrumentation diagram)
- Type test report for specific applications
- Revision drawing of the installation and the system (as built)
- Equipment applied including certificates
- Service & maintenance contract (based on the installation plan)
- Checklist with all checks carried out, consisting of at least:
 - Capacity calculation of secondary power supply
 - Functionality of controls (according standard/guideline and/or basic design)
 - Resistance measurement of activator(s)

An installation log (book) containing at least:

- General data
- Equipment applied
- Requirements to management, use, maintenance and service
- Precautions during activation of the system
- Precautions after activation of the system
- General rules and regulations for the user
- Periodical inspections of the system by the trained user
- Periodical inspections of the system by the responsible maintenance quality expert
- Material Safety Data Sheet (toxicity, sight reduction, thermal risks)
- Technical data of aerosol extinguishing components
- Fire-extinguishing system certificate and product certificates of the various components
- Installation plan including supporting documents (installation drawing, block diagram and function matrix)
- User manual fire-extinguishing system
- Maintenance reports

The certified supplier shall instruct the user regarding the operation and periodical maintenance of the fire-extinguishing system based on dry aerosol.

The name of the trained user(s) of the system shall be recorded into the installation log (book) and in the certified supplier / installer's registry.

4.5.1 Room integrity in relation to volume protection

According K23001 "open" areas are generally allowed as, for example, small gaps/notches between wall and ceiling (spread evenly across the room) but not as, for example, fixed open ventilation piping or a hole/opening in a wall or ceiling.

- Open ventilation piping or a hole/opening in a wall or ceiling are to be considered as a defect regarding the architectural and/or technical design of the room.
- Small gaps/notches between wall and ceiling are to be considered as a defect regarding the architectural finishing of the room.

The maximum “open” or “leakage” area during extinguishing is 0.1% of the volume of the room.

For example:

Room volume in M ³	Maximum “open”- or “leakage” area in M ²
1000	1
500	0.5
100	0.1

When a visual inspection does not provide in a sufficient insight about the room integrity, a door fan test shall be carried out to insure the room integrity.

Also regarding the room integrity, see ISO15779;

- D7 Test of the determination of the maximum leakage area/volume ratio and specifically
- D.7.1.4 Determination of hold time.
In case the minimum hold time of 10 minutes is achieved with a leakage area less than 0.1% of the room volume, the maximum “open” area or leakage area during extinguishing shall be according the test result(s).

4.6 Service & maintenance

Periodical service & maintenance of the fire-extinguishing system should be carried out to ensure its good condition and its integrity in relation to the use of the room and its actual application. Performing the service & maintenance work shall be in accordance with the manufacturer's guidelines and minimal annually.

4.7 Activities after extinguishing

The installer shall provide instructions in the user manual about, at least, the following aspects:

- How to act during extinguishing. It shall describe how the extinguishing function of the fire-extinguishing system can be maximised.
- How the room and any other provisions or equipment present shall be cleaned after the extinguishing.
- How the fire-extinguishing system can be restored into its certified or normal condition.

5 Product and system requirements, verification and tests

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 process certificate.

Based on the established design the certified installer uses components and materials as per the following specifications:

Standard or guideline	Regarding	Published
EN 54-1	Fire detection and fire alarm systems Introduction	1996
EN 54-2/A1	Fire detection and fire alarm systems: Control and indicating equipment	1999
EN 54-3/A1	Fire detection and fire alarm systems: Fire alarm devices – Sounders	2002
EN 54-4/A1	Fire detection and fire alarm systems: Power supply equipment	2003
EN 12094-1	Fixed fire-fighting systems - Components for gas extinguishing systems - part 1: requirements and test methods for electrical automatic control and delay devices	2003
K23001/05	Requirements for the product certificate for non-pressurized condensed aerosol generators and components used in fixed fire extinguishing systems	2018

Certified products

The supplier or manufacturer submits reports according to chapter 1.3 of this certification guideline .

The certified 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.

Normalized products without 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 without product control mark, as well as the visual check of material and/or packaging specifications.

Non-normalized products

All non-normalized products shall be inspected for its function by the certified supplier.

All materials shall be inspected visually for damage before assembly.

5.2 Control unit of the aerosol generators

The control unit shall be, after the activation signal generated by the second fire alarm, able to:

- Activate the aerosol generators(s) in the protected area after the determined delay time (EN12094 and CEN/TR 15276-2).

The Fire extinguishing panel performance shall be demonstrated to Kiwa by type tests. Voltage loss and power calculations (first and second law of Kirchhoff) and installation drawings in the installation plan shall be bases for this demonstration. Chapter 5 of EN 54-13 “Fire detection and fire alarm systems - Compatibility assessment of system components” shall be taken into account during this inspection and tests.

Kiwa shall witness this tests and record the results. The specific configuration shall be tested on its performance to active all the generators.

The output of the type test shall be declared in the attest part of the product certificate of the certified supplier. When the configuration is changed, a new test shall be performed.

The type test shall be repeated every 5 years for verification.

In the type test report the following specifications shall be recorded:

- Cable length (at least 100 m) and cable specification;
- Voltage- and power of supply unit after full use in backup situation;
- Type and number of activators (all activators shall have been activated within the test set up);
- Type test set-up: configuration of control unit, cables and components;
- Function: short-circuit and wire cut protection and in case these occur, an fault message to the control unit.

5.2.1 Detection system performance requirements

The detection system shall be based on:

- EN 54-14 or equivalent standard

Note:

- *NEN 2535 is the standard in The Netherlands*
- *In case a national standard requires a higher level or criteria's these shall be implemented in the basic design*

Detection method shall be based on the following principals:

Type of application	Type of protection	Number of criteria	Detection of	Activation criteria
Room	Total flooding	3	CO, heat and smoke	2 detectors or 2 groups
Object / cabinet	Total flooding	2	CO and heat	
Specific	See protocol	See protocol	See protocol	
Note: Specific applications shall be based on a test protocol and according 5.4				

5.3 Aerosol fire extinguishing system performance requirements

The relation of the performance requirements of the fire panel as described in 5.2, the detection system as described in 5.2.1., the certification fire extinguishing tests according K23001 and the architectural and technical conditions requirements as described in 5.3.1. and 5.3.2. (and therefor the fire-extinguishing system in total) is explained and graphically displayed in Annex A and shall be taken into account.

5.3.1 Architectural and technical conditions requirements

All relevant architectural and technical conditions for the fire-extinguishing system to be able to function, shall be defined by the certified supplier and implemented in the basic design.

For this, at least the following aspects should be taken into account:

- Architectural provisions for compartment integrity regarding fire-resistance, taking into account the influence of a fire from the inside and the outside and possible sudden pressure build-up by the flammable substances present in the compartment;
- Connection with provisions for fire detection with functional integrity, fire alarm equipment (optical and acoustic signalling devices) and manual alarm devices for blocking or activation of extinguishing. Before and during extinguishing a warning shall be signalled (acoustic and optical);
- Connection with technical installations such as ventilation and air handling systems, smoke control systems, doors, emergency power supply provisions, etc.
- These technical installations shall provide in, or shall be equipped with, a “fail save” function or supply;
- Usage of the room to be protected, regarding the storage configuration in the protected room. The relation between the flammable substances present and the design of the fire-extinguishing system shall be clear; this should be expressed in the risk analysis belonging to the integral safety concept of the room to be protected;
- Usage of the room to be protected, regarding the presence of people and any risks involved in this. This should be expressed in the risk analysis belonging to the integral safety concept of the room to be protected;
- The mutual influence of the protection of adjacent rooms and buildings;
- Before and during extinguishing a warning shall be signalled (acoustic and optical);
- The internal organisation of the protected object should have knowledge of the operation of the fire-extinguishing system and associated consequences.

The fire detection system itself and the entrance controls function of the fire detection system in relation to the controls of the fire-extinguishing system do fall within the scope of this certification guideline.

5.3.2 Architectural and technical conditions requirements related to pressure built up by the fire-extinguishing system

Architectural and/or technical provisions for compartment integrity regarding a possible pressure build-up by the system shall always be taken into account in the following situations and implemented in the basic design;

- Pressure build-up by the fire-extinguishing system related to a (high) density;
- Pressure build-up by the fire-extinguishing system related to the architectural finishing of the room.

In case of an architectural air tight finishing of the room, resulting in a 0% “open” or “leakage” area, pressure relief valves or provisions shall always be calculated and applied.

In case of an architectural non-air tight finishing of the room, resulting in a “open” or “leakage” area of maximum 0.1% of the volume of the room, the manufacturer shall provide in an verifiable and adequate calculation method or documentation regarding pressure build-up by the fire-extinguishing system and the use of pressure relief valves or provisions, related to the applicable aerosol density and declared or applicable, pressure related, room strength.

In case the pressure calculation indicates that the pressure built up by the fire-extinguishing system will exceed the maximum allowable pressure which the enclosure will or can withstand, pressure relief valves or provisions shall be calculated and applied.

Note:

Fire-extinguishing system engineers are not qualified to give guidance on compartment integrity or pressure related room strengths. Therefore it is up to the client to provide this information. In most cases the client will ask the building contractor to provide this information. In the event that the client does not make clear what the allowable pressure is which the enclosure will or can withstand, it is necessary to obtain his awareness and acceptance of the basics used.

5.4 Type / system tests for specific applications

The determination of performance requirements of the aerosol's extinguishing performance for specific products or product groups and specific materials or material groups in the applicable fire class. The aerosol generators shall extinguish the products or materials in question effectively.

It could be necessary to test the extinguishing performance for specific products, materials or applications. To do so a test protocol shall be drafted. After successfully passing an application type test, the test results shall be recorded in the attest of the product certificate.

The attest describes for which products, materials and/or applications and scale a test has been performed in which an effective extinguishing has been effectuated.

Note.

Current understanding of the performance of these systems does not warrant the design of systems from first principles. The basic design and installation parameters of all systems should therefore be obtained from performance tests.

Where possible, an application specific test procedure should be preferred to a generic procedure.

The design of a test procedure should be in accordance with the established scientific and engineering principles of fire protection that incorporate widely accepted methods, empirical data, calculations, correlations and computer models, as exemplified by the standard ISO/TR 13387-1 to ISO/TR 13387-8, "Fire safety engineering", and as contained in engineering textbooks and technical literature.

The intent of these guidelines is to encourage the development of fire test procedures that

- *are based on a fire protection engineering evaluation of the fire hazard, the compartment conditions, and the performance objectives for the system*
- *are developed, carried out, and interpreted by qualified fire testing laboratories.*

Evaluation of the fire hazard

The evaluation of the fire hazards should result in a list of possible design fires. The design fires should be defined at least in terms of:

- fuel (e.g. wood, plastics, cable, flammable liquid, gas);
- arrangement (e.g. crib, pile, shelved storage, pool, flowing fire, spray);
- size (dimension of the fuel array, area of the pool, or flow rate of a flowing or a spray fire);
- obstructions;
- ignition source/procedure.

The case of ventilation controlled fire applies to fires inside enclosure that may be fully closed or that may have small ventilation openings. It has been shown that in such cases, these systems have properties that are somewhat similar to gas fire extinguishing systems; the properties are pronounced for fires that are large with respect to the enclosure volume (of the order of 1 kW/m³ to 2 kW/m³ or larger). The key enclosure parameters are the following:

- enclosure volume;
- air exchange rate for forced ventilation;
- vent dimensions and orientation for natural ventilation.

For both fuel and ventilation controlled fires, the ambient conditions (temperature, moisture, air flow) surrounding the hazard, and the fire resistance and tightness of structures close to the hazard need to be evaluated.

Depending on the objectives, other parameters might be included to evaluate system performance in addition to the above-mentioned performance objectives. These include:

- structural integrity;
- damage to sensitive equipment or systems;
- smoke damage;
- visibility;
- tenability;
- flash-over prevention.

When these systems are tested for the purpose of fire extinguishment, special attention should be given to maximise the probability of fire extinguishment in real applications. One way of doing this is to test against a number of fire and ignition scenarios, and to use a range of system parameters to find out the optimum range for installations.

Execution

A type test for a certificate can only be carried out on the aerosol that the supplier has submitted under certificate of the K23001. The test is carried out in compliance with K23001, with different test room dimensions.

6 Requirements in respect of the quality system

This chapter contains the requirements which have to be met by the supplier's quality system.

6.1 Manager of the quality system

Within the supplier's organizational structure an employee shall have been appointed who is in charge of managing the supplier's quality system.

6.2 Internal quality control/quality plan

The supplier shall have an internal quality control scheme (IQC scheme) which is applied by him.

The following shall have been demonstrably recorded in this IQC scheme:

- what aspects are checked by the producer;
- according to what methods such inspections are carried out;
- how often these inspections are carried out;
- in what way the inspection results are recorded and kept.

This IQC scheme should at least be an equivalent derivative of the model IQC scheme included in the addendum.

The quality plan shall be used in context with the Kiwa-Regulations for Certification. This regulation details the method employed by Kiwa for conducting the necessary investigations prior to issuing the product certificate and the method of external control.

6.3 Procedures and working instructions

The supplier shall be able to submit the following:

- Procedures for:
 - handling products showing deviations;
 - corrective actions to be taken if non-conformities are found;
 - handling with complaints about products and/or services delivered;
- The working instructions and inspection forms used.

6.4 Legal liability

The certified supplier or installer shall have a valid liability insurance of at least 1 million EURO and should be officially registered as a company (Chamber of Commerce). In this registration the scope should be clearly stated.

The certified supplier shall have a legal qualification and supply agreement of the certified manufacturer of the extinguishing aerosol generators.

6.5 Other requirements to the quality system

The certified supplier quality system level shall meet the requirements of the applicable ISO9001 standard or an equivalent.

The quality system arranges that every installation or system within the scope of this certification guideline is delivered or maintained according to paragraph 6.15 of this certification guideline.

6.6 Organisation and personnel

The tasks, responsibilities and mutual relations of the employees of the supplier or installer shall be recorded in written form in an organisation chart or structure diagram. For each company and for each design team/installation team all personnel with their responsibilities, authorisations and respective replacements who shall check the implementation of the activities, shall be known at Kiwa at all times.

The installation team's personnel who are responsible for its quality shall be present during installation activities. The certified supplier shall inform Kiwa about changes in the organisation by postal or email correspondence.

6.7 Competences personnel

Within the regulations competences apply.

Personnel responsible for quality within the certified company

Qualification by:	Management
Level	High
Experience	1 year within field of application (demonstrable)
Education	<ul style="list-style-type: none"> - All manufacturer's application trainings, for which the company is certified to install - Qualification based on end terms as stated in this certification guideline
Knowledge of:	K23003 and K23001

Design engineer for projecting fire-extinguishing system

Qualification by:	Personnel responsible for quality within company
Level	Mid – High
Experience	1 year within field of application (demonstrable)
Education	<ul style="list-style-type: none"> - All manufacturers' application trainings, for which the company is certified to install. - Technical / electrical / chemical engineering. - Qualified design engineer fire detection and alarm systems - Qualified design engineer for fire extinguishing based on end terms as stated in this certification guideline
Knowledge of:	<ul style="list-style-type: none"> - K23003 and K23001 - Dutch and European legislation and regulations in the field of fire protection, including Building Regulations and Working Conditions Act - Fires and fire-extinguishing - Fire detection, alarm and fire-extinguishing system control - Specifics of this type of extinguishing systems
The specific fields of expertise may be divided among several personnel within the certified company.	

Technician responsible for installation

Qualification by:	Management
Level	Mid – Low
Experience	1 year within field of application (demonstrable)
Education	<ul style="list-style-type: none"> - All manufacturer's application trainings, for which the company is certified to install - Qualified installation technician fire detection and alarm systems - Qualified installation technician for fire extinguishing based on end terms as stated in this certification guideline
Knowledge of:	<ul style="list-style-type: none"> - K23003 - Specifics of this type of extinguishing systems - Fire detection, alarm and fire-extinguishing system control - Building regulations (where relevant)
The specific fields of expertise may be divided among several personnel within the certified company.	

Technician responsible for maintenance

Qualification by:	Management
Level	Mid – Low
Experience	1 year within field of application (demonstrable)
Education	- All manufacturer's application trainings, for which the company is certified to install - Qualified maintenance technician fire detection and alarm systems - Qualification based on end terms as stated in this certification guideline
Knowledge of:	- K23003 - Specifics of this type of extinguishing systems - Fire detection, alarm and fire-extinguishing system control - Building Regulations (where relevant)
The specific fields of expertise may be divided among several personnel within the certified company.	

6.8 Requirements training courses

The end terms of the certified suppliers application training shall be in accordance with the mentioned competences in 6.7. The end terms are laid down in a separate document under the supervision of the board of experts.

6.9 Subcontracting of activities

In case of design and installation activities are performed by subcontractors, then these subcontractors themselves shall be certified in compliance with this certification guideline.

If (parts of) the installation activities are performed by subcontractors, these subcontractors shall meet the same requirements as the certified supplier. See 6.7. Procedures have to be included in the IQC scheme in which the certified supplier declares how the subcontractors performance quality is guaranteed. It concerns the following aspects:

- Equipment/material to be used;
- Working instructions for the subcontractor;
- Inspections to be carried out by the subcontractor;
- The entrance inspections of the certified installer;
- Quality registration of the subcontractor and the certified installation mechanic.

The subcontractor should always be registered at Kiwa prior to commencing the activities.

6.10 Document control

Document, such as the quality plan (IQC scheme), working instructions, regulations, standards, guidelines, drawings, installation plans and checklists shall be available in the office of the certified supplier / installer.

The certified installer's installation team shall possess the working instructions, drawings, installation plan and checklists.

6.11 Checking equipment and materials

The certified supplier shall have equipment to inspect the installation.

The minimal set of equipment is:

- Voltmeter (V), current meter (A) and resistance meter (Ω) (calibrated on the specifications and applicable range, maximum tolerance is 5%);
- Test device to check the activator of the aerosol extinguishing component (calibration not possible). This can be a resistance meter (Ω);

- Distance (M) measuring equipment to determine the volume of the room (calibrated on the specifications and applicable range, maximum tolerance is 2%)

6.12 Storage of equipment and materials

All equipment and materials used by the certified supplier should be identifiable and stored dry at the company's premises as well as at the installation site. The aerosol generator(s) and all other components of the fire-extinguishing system should also be stored dry and free of weather influences, with a storage temperature between -50 °C and + 100 °C or according to the manufacturers guidelines. Storage and treatment shall be done in such a way that damaging of the product is prevented. The manufacturer shall indicate the maximum storage life.

Waste material, material to be repaired and material to be cleaned shall be identified and separated clearly from other materials.

6.13 Registrations / checklist

The installation shall be checked, measured and set in regard to the fixed and durable reference points. During installation activities a full registration shall be kept. The following items shall be recorded:

- Location of installation
- Company and executor
- Date of execution
- Installation method and materials used
- All relevant data regarding:
 - All special visual observations
 - The results of the checks performed and the executing personnel
 - The equipment and components used with matching identification

For registration the certified installer should use standard checklists. Furthermore for each installation location an installation drawing shall be present at the location in question.

These data will be expressed in the revision drawing drawn to scale.

The registration shall be archived for at least 5 years or until 1 year after retirement of the installation.

6.14 Fire-extinguishing system declaration of conformity

At least one month before putting into service and acceptance or aftercare activities of a fire-extinguishing system, the certified supplier shall register this with Kiwa. The requirements for granting a fire-extinguishing system certificate after the inspection are that no critical or major nonconformity are found during the inspection of the basic- and detailed design and the fire-extinguishing system itself. Based on the registration with Kiwa and a positive report after the inspection, the supplier is authorized to declare conformity about the fire-extinguishing system with this certification guideline .

Only a registered declaration of conformity at Kiwa is valid.

The certified supplier is obliged to exclusively use the model provided by Kiwa.

The design documents shall contain the certification mark and a reference to K23003.

The declaration of conformity has a validity of 12 months provided that the conditions and principles of design do not change or will be changed.

6.15 Reporting activities

The certified supplier shall report his installation and aftercare/maintenance activities at least 1 month in advance to the Certification Body.

For an audit or project inspection an appointment has to be made.

6.16 Certification mark

The certification mark is to be applied to certified delivery or maintenance.

This mark shall be affixed and used according to the requirements in the product certificate.



The product certificate is listed at the website of Kiwa. The Certified Company shall have a link on his own website to this listed product certificate on the Kiwa website. By this is secured that the proper and complete version of the Certified Company's certificate is communicated.

7 Summary of tests and inspections

This chapter contains a summary of the following tests and inspections to be carried out in the event of certification:

- Pre-certification tests;
- Inspection test of performance, process and product requirements;
- Inspection and auditing of the quality system.

The frequency with which Kiwa will carry out inspection tests is also stated in the summary.

7.1 Inspection and test matrix

Description of requirement	Article	Inspection within scope of		
		Pre-certification test	Surveillance by Kiwa Inspection	Frequency
Process requirements	All articles	X	N/A	Per system
Detailed design, installation, putting into operation, acceptance, aftercare	Chapter 4	X	X	Per system
Product requirements	Chapter 3	X	X	Per system
Quality system requirements	Chapter 6	X	N/A	Per system

Table: Testing, inspection & auditing matrix

7.2 Auditing of the quality system and inspection of the installation

The quality system of the supplier shall be audited by Kiwa on the basis of the certification scheme and the applicable IQC scheme.

The audit contains at least those aspects mentioned in the Kiwa Regulation for Certification (5.1) and the requirements of the installation according to this certification guideline. The inspection of the installation is carried out based on the requirements in ISO/IEC 17020.

The quality system of the certified supplier is audited every 12 months at his office. The output of the delivery and maintenances process of the installation by the supplier is inspected for every installation with a volume protection or special application.

The output of the delivery and maintenances process by the supplier is inspected for every 50th installation with a source protection.

7.3 Inspection of the system

The inspection of the system is carried out based on the following inspection plan. Plan has a list with inspection points of installation erected without certification under accreditation and with certification under accreditation.

The basic product level is based on a product certificate of the K23001. Another possibility is by means of a third party certificate with a relevant scope and equal to the product certificate of the K23001.

Note: acceptance of this certificate after an positive assessment by Kiwa.

Initial inspection of the aerosol extinguishing system			
Part	Method ¹		Inspection Points
	With certificate	Without certificate	
Basic design and detail design	A	A	Presence and completeness (all information relevant for inspection)
	A	A	Basic design approved by plaintiff(s)
	A	A	Basic design mentions the derived objectives and no deviating requirements in relation to the objectives
	A	A	Detailed design is based on the basic design
Aerosol-generators	A	F, M, P	With valid product certificate

Initial inspection of aerosol extinguishing system and/or fire alarm system			
Part	Method ²		Inspection Points
	With certificate	Without certificate	
Basic design and detail design	A	A	Presence and completeness (all information relevant for inspection)
Installation	V	V, P, M	Installation is fully operational
General requirements		A	Equipment standards
		A	Compatibility statement and commissioning statement
		V/A	Environmental conditions central equipment
		V/A	Components suitable for the application
Performance requirements		V/A	Performance requirement fire size.
		P	Test(s) according K23001
Monitoring Size	V	V	Monitoring required spaces/rooms.
Network		F	Failure in network central equipment or in part of the network
		F/V	General alerts on main fire alarm control panel
		F	Maximum time of alerts
		V/F	Other participants/components in the network
		F	Interface module management system
Aerosol-and/or fire alarm control panel	V /A	V/F	Mandatory options/features
		V	Text
		V	Hand- and vision range
		V/F	Alerts and controls
		F	Access Levels
		V/F	Integration clearance early warning equipment
	V	V/F	Position in relation to the internal organization
	V	F	Interfaces C1, E, G, J, M
		F	Maximum time alerts/notifications
	F	F	Delay time in accordance with basic design
Energy Supply	V	V	Primary energy supply
		V	Safety device in accordance with NEN 1010
	M	M	Autonomy secondary energy supply
		V/A	Capacity charging installation
		F	Switching from primary to secondary
Fire Panel		V/F	Alerts/fault alarm
	A	A	Approval fire brigade (only in case of mandatory reporting to RAC).
	V	V	Place
	V	V	Orientation (geographic fire Panel/drawing).
	V	V	Detection zones
	V	V	Hand- and vision range
	V/F	V/F	Alerts and controls
Side Panel	V	V	Position
	V	V	Hand and vision range
	V/F	V/F	Alerts and controls
Side indicator		F	Signaling
		V	Place
		V	Implementation

¹ The column "> Method with certificate" applies only to under accreditation established aerosol systems

² The column "> Method with certificate" applies only to under accreditation established aerosol systems

Initial inspection of aerosol extinguishing system and/or fire alarm system			
Part	Method ²		Inspection Points
	With certificate	Without certificate	
Detector / signal transducer ^{1 2}	V	V	Presence and type of detector/signal transducer.
	F*	F/V	Functionality controls from interfaces C1, E, G, J, M. * activation of 1 detector per group
Automatic smoke detector		V	Scope/field of application
		V	Number per space and place
		V	Distance smoke sensitive element to ceiling
		V	Measures prevent unwanted/spurious notifications
	F*	F	Signaling on detector, fire alarm control panel and panels * Activation of 10% of the detectors per group
Manual call point	F	F	Control functions
		V	Design
		V	Place and position
	F*	F	Signaling on detector, fire alarm control panel and panels *minimum activation of 1 detector per group
External detector	F	F	Control functions
	F*	F*	Signaling on detector, fire alarm control panel and panels *100% of the detectors per group
Duct Detector	V	V	Place and position
	F*	F	Signaling on fire alarm control panel and panels. *25% of the detectors per group
	F	F	Control functions
Smoke switch		V	Performance requirement fire size
		V	Distance Dv
	V	V	Place and position
	F*	F	Signaling on fire alarm control panel. *minimum activation of 1 detector per group
	F	F	Control functions
	A / V	A/F	Presence
Insulators		V	Electrical safety provisions
		V	Assembly and construction of cables
		V/A	Function Maintenance/retention
	F	F	Monitoring
		F	Integrity/reaction to faults
		A/V	Detector loop in relation to area
		F	Loss alert detectors at failure
		A/F	Reliability wireless transmission
		V	Mutual influence
	V	V	Electrical connections
Transmission Path		V/F	Origin message clear
		V/A	Dimensions and/or format
Detection zone		A/F	Detector group in relation to detection zone
		A/F	Differentiation of detectors in Group
Detector Group	V/F	V/F	Integration with other systems (also not supplied by the contractor)
	A/F	A/F	Adverse impact of not demanded elements (in terms of functionality or performance requirements)
	F	F	Supply, performance or functionality mentioned In basic design ³
Overig			

¹ Fire alarm system: detector, extinguishing installation: sensor

² This point only applies in case of an Product Certificate. If an Product Certificate is not present the following ten (10) inspection points shall be followed

³ Outside the designated accepted standard

Follow-up inspection of fire protection based aerosol systems			
Part	Method¹		Inspection Points
	With certificate	Without certificate	
Basic design and detail design	A	A	Presence and completeness (all information relevant for inspection)
	A	A	Basic design approved by plaintiff (s)
	A	A	Basic design mentions the derived objectives and no deviating requirements relative to the standard
	A	A	Detailed design is based on the basic design
Maintenance	A		Based on an accepted certification guideline
	A		Final inspection by maintainer
	A		Maintainer certified for delivery product
	A		CI accredited
	A		Scope certificate
	V		Certificate is applicable for the installation
	A		Certificate is applicable for the basic and detailed design
	V/A		No changes since issuing of certificate
	V	V	Installation is fully operational
Log	A	A	Presence, content, completeness, data of maintenance carried out
Generators	V	V	Projection relative to obstructions
		V / F	Testing aerosol generators on factory specifications (frequency according to applicable standards stated)

Follow-up inspection of Aerosol fire extinguishing system and/or fire alarm system			
Part	Method		Inspection Points
	With certificate	Without certificate	
Basic design and detail design	A	A	Presence and completeness (all information relevant for inspection)
Maintenance Certificate	A		Based on an accepted certification guideline
	A		Final inspection by maintainer
	A		Maintainer certified for delivery product
	A		CI accredited
	A		Scope certificate
	V		Certificate is applicable for the installation
	A		Certificate is applicable for the basic and detailed design
	V/A		No changes since issuing certificate
	V		Installation is fully operational
	A		Based on a well-known certification guideline
Performance requirements		A	Performance requirement unwanted/spurious notifications
		A	Performance requirement system availability
Monitoring Size		V	Monitoring required spaces/rooms.
Network		F	Failure in network central equipment or in part of the network
	F	F	General alerts on main fire alarm control panel
		F	Maximum time alerts
	V/F	V/F	Other components in the network
		V/F	Interface module management system
Aerosol-and/or fire alarm control panel	V/A	V	Maintenance status
		V/F	Mandatory options/features
		V	Texts
		F	Alerts and controls
		V/F	Integration evacuation alarm equipment
		F	Interfaces C1, E, G, J, M.
		F	Maximum time alerts/notifications
		F	Delay time in accordance with basic design

¹ The column "> Method with certificate" applies only to aerosol systems established under accreditation

Follow-up inspection of Aerosol fire extinguishing system and/or fire alarm system			
Part	Method		Inspection Points
	With certificate	Without certificate	
Energy Supply		V	Primary energy supply
		V	Maintenance status
	M*	M*	Autonomy secondary energy supply * If battery is older than 3 years
		F	Switching from primary to secondary
Fire Panel		F	Alerts/fault alarm
		V	Maintenance status
Side Panel		F	Alerts and controls
		V	Maintenance status
Detector/signal transducer ^{1 2}	V	V	Presence and type of detector
	F*	F	Functionality controls from interfaces C1, E, G, J, M. *1 detector per group
Automatic smoke detector		V	Maintenance status
		V	Measurements to prevent unwanted/spurious notifications
	F*	F	Signaling on detector, side indicator, fire alarm control panel and Fire Panel. *10% or a minimum of 1 detector of the detectors per group
		F	Control functions
Manual call point		V	Maintenance status.
	F*	F	Signaling on detector, fire alarm control panel and Fire Panel. *20% of the detectors per group
	F	F	Control functions
External detector		V	Maintenance status
	F*	F*	Signaling on fire alarm control panel and fire Panel *100% of the detectors per group
	F	F	Control functions
Duct detector		V	Maintenance status
	F*	F	Signaling on fire alarm control panel and fire Panel *25% of minimum of 1 detector per group
	F	F	Control functions
Smoke Switch		V	Maintenance status
	F*	F	Signaling on fire alarm control panel. *minimum of 1 detector per group
	F	F	Control functions
Transmission Path		V/A	Function Maintenance/retention
	F	F	Monitoring
		A/V	Integrity/reaction to faults
		F	Loss alert detectors at failure
		A/F	Reliability wireless transmission
Detection zone		V/F	Origin message clear
		V/A	Dimensions and/or format
Other	A/F	A/F	Integration with other systems (also not supplied by the contractor)
	A/F	A/F	Adverse impact of not demanded elements (in terms of functionality or performance requirements)
	F	F	Supply, performance or functionality mentioned In basic design ³

Abbreviations legend

A; Administrative
V; Visually
F; Functional
M; Measurements
P; performance requirements according K23001

¹ Fire alarm system: detector, extinguishing installation: sensor

² This point only applies in case of a Product Certificate. If a Product certificate is not present the following eight (8) inspection points shall be followed

³ Outside the designated accepted standard

7.4 Acceptance and rejection criteria aerosol extinguishing systems

Aerosol installation:

1. The basic design or the detailed design do not contain the necessary information to be able to carry out the inspection.
2. The basic design is disapproved by the applicant (s) or does not mention the derived objective (s).
3. The detailed design is not worked out in accordance with the basic design.
4. The applied components do not have the necessary quality.
5. The installation is not fully operational.
6. The aerosol generators are not correctly placed, not properly installed, damaged or exhibiting corrosion.
7. The density is not enough based on the required amount from the details design in relation to the number of generators and the efficiency.
8. The placement or projection of the generators does not conform to the detail design.
9. A performance requirement is not met or there is no data/information showing that it can be met.
10. The activation is not functioning or the generators are not or incorrectly controlled.
11. The space/room is not sufficiently airtight whereby the necessary hold time from the basic design is not guaranteed.
12. The minimum prescribed safety features or distances from the manufacturer or as stated on the certificate are not present or functional whereby the personal safety cannot be guaranteed.
13. Warning signs are not present, the delay or alarm do not function.
14. Controls that affect the air tightness of the space/room do not function.
15. Management, control or maintenance is not properly implemented.
16. The detection installation for activating the generators is not functional, does not meet the standard or the provisions laid down in basic design or certificate.

Engineering:

1. Architectural separations do not meet the requirements indicated in the basic design, so that the density, filling time and hold time can be met.
2. Architectural separations do not meet the requirements or level of finish, such that there is a greater leakage loss is than 0.1% of the volume of the protected space.

Organization:

1. Its property, composition of the packaging and manner of storage does not match the density present in the space/room.
2. Free space under or from the aerosol generators is insufficient.
3. There are goods stored in the secure area of which has not (or cannot) be demonstrated that the fire can be put out with the applied concentration.
4. The detection installation for activating the generators is not functional, does not meet the standard or the provisions laid down in basic design or certificate.

7.5 Tests & inspection of the central processor

The inspection points that should be verified are indicated in the table below for a central unit that only meets EN 54-2.

Reference Table EN12094-1 versus EN54-2

Article number in EN12094-1	Topic in EN12094-1	Article number in EN54-2
1.	Scope	1.
2.	Normative references	2
3.	Concepts, definitions and abbreviations	3
3.1	Definitions	3.1
3.2	Abbreviations	3.2
4.	Functional requirements	
4.1	General	5
4.2	Environment Class	Environmental class = required
4.3	Signal processing and indicator	5.1
4.4	Receipt and processing of input initiating signals	Extra = required
4.5	Transmission of extinguishing signal	Extra = required
4.6	Activation of alarm equipment	7.8
4.7	Indication of power supply	5.4
4.8	Activated-condition	7.2
4.9	Indication of the activated-condition	7.5
4.10	Outflow Condition	Extra = required
4.11	Indication of the outflow condition	Extra = required
4.12	Re-establishment of the activated-condition and the outflow condition	Extra = required
4.13	Fault Reporting Condition	8.1
4.14	Indication of the failure notification condition	8.2
4.15	Disabled-condition	9.2
4.16	Indication of the Disabled-condition	9.3
4.17	Delay of extinguishing signal (option) (= x seconds, see BRL)	Extra = required
4.18	Signal that outflow of fire-extinguishing medium represented (option)	Extra = n/a
4.19	Monitoring the status of the components (option) (continuous surveillance signals, see BRL)	Extra = required
4.20	Emergency Guard Equipment	Extra = n/a
4.21	Control of outflow time	Extra = n/a
4.22	Initiating second outflow	Extra = n/a
4.23	Only manual mode	Extra = n/a
4.24	Control signals to equipment in the system (option)	7.8,7.9.1,
4.25	Fire signals to reserve cylinders (cylinders equals generators)	Extra = n/a
4.26	Controlling equipment outside the system	7.10
4.27	Emergency stop equipment (option)	Extra = required
4.28	Control of extensive discharge	Extra = n/a
4.29	Releasing extinguishing media for selected outflow zones	Extra = required
4.30	Activate alarm equipment with various signals (option)	7.8
5.	Design Requirements	
5.1	Algemeen	12.2
5.2	Mechanical design	12.3
5.3	Manual control	Extra = required
5.4	Visible indicators	12.7
5.5	Audible indicators	12.10
5.6	Electric design of components	12.4
5.7	Circuit Design	Extra = required
6.	Additional design requirements for software-controlled control and indication equipment	
6.1	General	13.1
6.2	Software Design	13.3
6.3	Application Control (program)	13.4
6.4	Storage of programs and data	13.5
6.5	Control of memory contents	13.6
6.6	Software documentation (is checked)	Extra = required
6.7	Use of the control and indication equipment in case of system error	13.7
7.	Marking	
8.	Documentation (see BRL)	14
9.	Tests	Extra = required
9.1	General test requirements	15
9.2	Functional tests	15.1
9.3	Environmental tests	15.2
9.4	Damp heat, cyclic	15.3
9.5	SO2-corrosion (durability)	15.4,15.5
10.	Evaluation of conformity	15.15
10.1	General	Extra = required
10.2	Testing of Initial type	Extra = required
10.3	Factory production control	Extra = required
Annex A	Summary of indications	Info
Annex ZA	Clauses on the facilities of the EU Construction Products Directive 89/106/ECC	Info

8 Agreements on the implementation of certification

8.1 General

This chapter contains the agreements made by the Board of Experts on the implementation of the certification by the certification body.

8.2 Certification personnel

The personnel involved in the certification may be divided into:

- **Certification experts:** in charge of the implementation of the pre-certification tests and the assessment of the inspectors reports;
- **Auditors/Inspectors:** in charge of the implementation of external inspections of the installer at the project location and at the installer's office. The inspectors do inspect the fire alarm system as well;
- **Decision makers:** in charge of taking decisions in connection with the pre-certification tests carried out, of continuation of the certification in connection with inspections carried out and decisions regarding the need to take corrective actions.

8.2.1 Qualification requirements

The following qualification requirements have been set up by the Board of Experts regarding the subject of this certification guideline :

Certification personnel	Education	Experience
Certification assessor	<p>Higher level of professional education in one of the following disciplines:</p> <ul style="list-style-type: none"> • Technical, chemical or electrical engineering or equivalent • Audit training • High school or equivalent <p>Knowledge of</p> <ul style="list-style-type: none"> • K23001 and K23003 • Dutch and European legislation and regulations in the field of fire protection, including Building Decree and Working Conditions Act • Fires and fire-extinguishing • Fire detection and fire-extinguishing system control • Specific extinguishing systems • Directives mentioned in K23001 and K23003 	3 years with product certification
Auditors / Inspectors	<p>Intermediate level of professional education</p> <ul style="list-style-type: none"> • Technical, chemical or electrical engineering or equivalent (A/I) • Audit training (A) • Projection expert fire alarm systems (I) • Qualification based on end terms in annex K23001 and K23003 (A/I) • Dutch and European legislation and regulations in the field of fire protection, including Building Decree and Working Conditions Act (A/I) • Fires and fire-extinguishing (A) • Fire detection and fire-extinguishing system control (A) • Specific extinguishing systems (A) • Directives mentioned in K23001 and K23003 (A/I) 	3 years with product certification
Decision makers	<p>Higher level of professional education</p> <ul style="list-style-type: none"> • Product and product certification 	5 years' management experience

Table 2. Qualification requirements

Proof of the level of education and experience of personnel involved must be recorded.

The project audit/inspection is not necessarily united in one person. This is detailed in the function description by means of an (A) for auditor and an (I) for inspector.

8.3 Equipment and materials

The testing, inspection and certification (TIC) body shall have at its disposal all means necessary to properly carry out inspection activities.

The TIC body should have a minimal set of equipment:

- Voltmeter (V), current-meter (A) and resistance meter (Ω) (calibrated on the specifications and applicable range, maximum tolerance is 2%);
- Distance (M) measuring equipment to determine the volume of the room (calibrated on the specifications and applicable range: maximum tolerance is 2%).

8.4 Detailed instructions

Details about the evaluation of the process are laid down in the Kiwa quality plan accompanying this certification guideline . This details are about:

- Model Kiwa certificate about the supplier;

- Model declaration about the installation / system by the supplier;
- Model Kiwa audit and inspection report.

8.5 Specific rules determined by the Board of Experts

The Board of Experts has determined the following specific rules upon which shall be acted when carrying out certification by Kiwa.

- The year report to the Board of Experts shall also contain the results of certification and audits.
- Agreements regarding execution of certification inspections are:
 - Before the company is allowed to accept projects, it shall have successfully passed a documentation audit. Kiwa will issue a declaration on this. Based on this declaration the company can inform ordering customers about the status of the certification inspection.
 - The company subject of the pre-certification inspection shall have installed 1 fire-extinguishing systems without any faults, before the company can be certified.

8.6 Sanctions

The Board of Experts has determined the following specific rules upon sanctions which shall be acted when carrying out certification by Kiwa when. They shall be yearly informed about specific sanctions.

8.6.1 Critical nonconformity

Any nonconformity which may result in hazardous or unsafe conditions for individuals using, maintaining or depending upon the product or prevent performance of a vital agency mission.

Actions by supplier; immediately correction and investigation towards the root course of the nonconformity and taking proper corrective actions.

Action by Kiwa; verification and inspection on the conformity of the output. Verification and auditing of the investigation and the corrective actions.

8.6.2 Major nonconformity

Any nonconformity other than critical, which may result in failure or materially reduce the usability of the product for the intended purpose (i.e. effective use or operation, weight or appearance (where a factor), health or safety) and which cannot be completely eliminated by rework or reduced to a minor nonconformity by an approved repair.

Actions by supplier; quick correction and investigation towards the root course of the nonconformity and taking proper corrective actions.

Action by Kiwa; verification and if needed inspection on the conformity of the output. Verification and auditing of the investigation and the corrective actions.

8.6.3 Minor nonconformity

Any nonconformity which does not adversely affect the performance, durability, interchange ability, reliability, maintainability, effective use or operation, weight or appearance (where a factor), health or safety of a product. Multiple minor nonconformities when considered collectively may raise the category to a major or critical nonconformity.

Actions by supplier; correction in conjunction with the agreements with the client.
Investigation towards the root cause of the nonconformity if they occur in a non-acceptable frequency and then taking proper corrective actions.

Action by Kiwa; verification and if needed inspection on the conformity of the output.
Verification and auditing of the investigation and the corrective actions.

9 List of reference documents

9.1 Standards

ISO/IEC 17020: Conformity assessment - General criteria for the operation of various types of bodies performing inspection.

ISO/IEC 17021: Conformity assessment - Requirements for bodies providing audit and certification of management systems.

ISO/IEC 17024: Conformity assessment - General requirements for bodies operating certification of persons.

ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories.

ISO/IEC 17065: Conformity assessment - Requirements for bodies certifying products, processes and services.

K23001/05: 2018; Requirements for the product certificate for non-pressurized condensed aerosol generators and components used in fixed fire extinguishing systems.

ISO 15779: 2011; Condensed aerosol fire extinguishing systems — Requirements and test methods for components and system design, installation and maintenance — General requirements.

CEN/TR 15276-1: 2009; Fixed firefighting systems - Condensed aerosol extinguishing systems - Part 1: Requirements and test methods for components.

CEN/TR 15276-2: 2009; Fixed firefighting systems - Condensed aerosol extinguishing systems - Part 2: Design, installation and maintenance.

NFPA 2010: 2006; Standard on Aerosol Fire-Extinguishing Systems.

MSC.1/Circ.1270: 2008; Revised guidelines for the approval of fixed aerosol fire-extinguishing systems equivalent to fixed gas fire-extinguishing systems, as referred to in SOLAS 74, for machinery spaces.

EN 54-1: 1996; Fire detection and fire alarm systems Introduction.

EN 54-2/A1: 1999; Fire detection and fire alarm systems: Control and indicating equipment.

EN 54-3/A1: 2002; Fire detection and fire alarm systems: Fire alarm devices – Sounders.

EN 54-4/A1: 2003; Fire detection and fire alarm systems: Power supply equipment.

EN 54-13: 2017; Fire detection and fire alarm systems - Part 13: Compatibility and connectability assessment of system components.

CEN/TS 54-14: 2004; Fire detection and fire alarm systems - Part 14: Guidelines for planning, design, installation, commissioning, use and maintenance.

NEN 2535: 2017; Fire safety of buildings - Fire detection installations - System and quality requirements and guidelines for detector siting.

NEN 2654-1: 2018; Management, control and maintenance of fire safety systems - Part 1: Fire detection and alarm systems.

EN 12094-1: 2003; Fixed firefighting systems - Components for gas extinguishing systems - Part 1: Requirements and test methods for electrical automatic control and delay devices.

EN 16763: 2017; Services for fire safety systems and security systems.

EN 13501-2: 2004; Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services.

NEN 6090: 2008; Determination of fire load.

ISO9001: 2015; Quality management systems – Requirements.

ISO/TR 13387-1:1999; Fire safety engineering - Part 1: Application of fire performance concepts to design objectives.

ISO/TR 13387-8:1999; Fire safety engineering - Part 8: Life safety - Occupant behaviour, location and condition.

ATEX 95 = ATEX114: Directive 2014/34/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 equipment and protective systems intended for use in potentially explosive atmospheres.

10 Annex A (informative)

This annex provides in an example for a correct design calculation for the activation of the aerosol extinguishing system within the time of the pre-certification tests (see Annex B) as performed according the Kiwa certification guideline K23001.

Implementation of the discharge time and the pre- and free burning times from the pre-certification tests, assures the functionality and objective of the aerosol fire extinguishing system. Therefore the last aerosol generator shall be activated and discharged within the pre- and free burning time from the pre-certification tests according the Kiwa certification guideline K23001, as follows:

Example 1

As an example a generator with a discharge time of 50 seconds is chosen. This means that, in case of a class A fire with plastics and after a determined delay time of 30 seconds, the last generator shall be activated within 130 seconds after the first generator.

See table below in which this is graphically explained:

Phase	>>>	>>>	>>>	>>>	>>>	>>>
	No fire / smoke development	Start of Fire	Fire	Fire	Fire	Suppression
			Variable	Depending on Fire Class and certification Test	Variable (Make and type)	
Occurrence	Time Fire start and development	Time Fire detection	Time in seconds Delay time	Time in seconds Activation of last generator	Discharge Time (last generator)	Suppression due to design density
Condition	1 th + 2 nd detection According EN54				100% of the design density in the room at this point in time →	
Time	--- / ---	--- / 0	30	160	50	210 / --- See Annex B
			130 (Time for activation of all generators after expiry of Delay Time)			
Effect and remark		Start of Delay Time ↑	Activation of first generator	Activation of last generator	minimum design density throughout the area	Fire extinguishing
		Start of Fire ↓				
		Pre- and free burning time from certification tests. See table below.				← Point in time of manual activation within certification test.
		Certification test according certification guideline BRL-K23001				
	Minimal time in which de compartment needs to keep its integrity in case of fire					

Fire extinguishing panel performance requirements graphically displayed

Note 1:

The delay time according EN12094 is limited up to 60 seconds in steps of 5 seconds. According to CEN/TR 15276-2 the minimum delay time is 10 seconds and shall be taken into account.

Note 2:

In The Netherlands the standard delay time is 30 seconds.

Example 2

As an example a generator with a discharge time of 85 seconds is chosen. This means that, in case of a class B fire and after a determined delay time of 30 seconds, the last generator shall be activated within -25 seconds after the first generator.

See table below in which this is graphically explained:

Phase	>>>	>>>	>>>	>>>	>>>	>>>	
	No fire / smoke development	Start of Fire	Fire	Fire	Fire	Suppression	
			Variable	Depending on Fire Class and certification Test	Variable (Make and type)		
Occurrence	Time Fire start and development	Time Fire detection	Time in seconds Delay time	Time in seconds Activation of last generator	Discharge Time (last generator)	Suppression due to design density	
Condition	1 th + 2 nd detection According EN54				100% of the design density in the room at this point in time →		
Time	--- / ---	--- / 0	30	5	85	90 / --- See Annex B	
			-25 (Time for activation of all generators after expiry of Delay Time, see note 3)				
Effect and remark		Start of Delay Time ↑	Activation of first generator	Activation of last generator	minimum design density throughout the area	Fire extinguishing	
		Start of Fire ↓					
		Pre- and free burning time from certification tests. See table below.					← Point in time of manual activation within certification test.
		Certification test according certification guideline BRL-K23001					
	Minimal time in which de compartment needs to keep its integrity in case of fire						

Fire extinguishing panel performance requirements graphically displayed

Note 1:

The delay time according EN12094 is limited up to 60 seconds in steps of 5 seconds. According to CEN/TR 15276-2 the minimum delay time is 10 seconds and shall be taken into account.

Note 2:

In The Netherlands the standard delay time is 30 seconds.

Note 3:

Choose another type of generator with a shorter discharge time and/or determine whether the delay time is correct in this case. See note 1.

11 Annex B (Informative)

This annex provides in the pre- and free burning times of the pre-certification tests as performed according the Kiwa certification guideline K23001.

Pre-certification test K23001	According	Class A Fire pre- and free burning time (in sec)	Class B Fire pre- and free burning time (in sec)	Remark
Polymeric Sheet Test	CEN/TR15276 A.6.3 ISO 15779 D.6.3	210	---	
Class A Compatible Wood Crib Test	ISO 15779 D.6.4	120	---	
Wood Crib Test	CEN/TR15276 A.6.1 ISO 15779 D.6.1	360 (180 + 180)	---	See K23001 regarding pre burn time
Composite Wood Fire Test	CEN/TR15276 A.6.4	360 (180 + 180)	---	
N-Heptane Pan Test	CEN/TR15276 A.6.2 ISO 15779 D.6.2	---	90 (60 + 30) Note: see ISO with test cans	

Note that this table is not complete and contains only the most common classes and tests. See the product certificate of the manufacturer according Kiwa K23001 for more details and information

12 Annex C (informative)

This annex provides in information about the standards involved for evaluation and inspection.

Installation and system evaluation based on ISO17065		
Subject	Concerning	Accordinging
Knowledge	Qualifications of personnel or persons involved	ISO17021
Verifying quality	Products or product components	ISO17065
Function	System verification of the performance requirements	ISO17020
Quality system	Verification of the quality system of the supplying company	ISO17021

Installation and system inspection based on ISO17020		
Subject	Concerning	Accordinging
Verifying quality	Products or product components	ISO17065
	Product inspection or testing	ISO17020
Function	System inspection verification of the performance requirements	ISO17020

13 Annex D (normative)

	Process Certificate <u>Kxxxxx/xx</u>			
	Issued Valid until Replaces Page			
CERTIFICATE	For fire-extinguishing systems based on non-pressurized condensed aerosol including:			
	<ul style="list-style-type: none">• Basic design of the system, drafting of specifications• Detailed design of the system, component selection and system design according to the basic design (engineering).• Installation of the system in accordance with the detailed design and commissioning the installation.• Support and maintenance.			
	STATEMENT BY KIWA With this process certificate, issued in accordance with the Kiwa Regulations for Product Certification, Kiwa declares that legitimate confidence exists that the products supplied by			
	Supplier name may, on delivery, be relied upon to comply with the Kiwa evaluation guideline BRL-K23003/02 "Product Certification Scheme for fixed fire-extinguishing systems based on non-pressurized condensed aerosol generators".			
				
	Luc Leroy Kiwa			
	This certificate is issued in accordance with the Kiwa Regulation for Certification.			
	This certificate consists of x pages. Publication of the certificate is allowed.			
	 Company			
	Kiwa Nederland B.V. <address>			
	The Netherlands <Phone number> <internet Website address>			
	<RvA logo>			
			Certification process consists of initial and regular assessment of: <ul style="list-style-type: none">• quality system• process	