

**ALLTEC TECHNICAL
SPECIFICATIONS FOR INSTALLATION,
COMMISSIONING & MAINTENANCE
OF THE FIXED CONDENSED AEROSOL
FIRE EXTINGUISHING SYSTEM.**

(CONVENTIONAL)

1. General

1. The total system will be (i) installed as referred to standard **BS 5839 - 1 : 2002** for fire detection and *fire alarm systems for buildings* and (ii) designed, installed, commissioned and maintained with *test methods for electrical automatic control and delay devices* as per (new) **BS EN 12094-1 2003 (old BS 7273)** (iii) designed, installed and maintained as per EU or US Directives (**ISO 15779 or BS EN15726-2 or NFPA 2010**) for *condensed aerosol fire extinguishing systems*.
2. Integrator will be trained by ALLTEC to design, install, test, and maintain The Aerosol Fire Extinguishing Systems.
Integrator confirms it's the capability of *recharging* the fire suppression system within 24 hours after a discharge.
Integrator shall include the supply and installation of all materials, equipment, fixtures & fittings, plant and labor necessary for the completion of the turn-key Project.
The Integrator confirms and includes a 3 year Maintenance contract or service agreement with an option to extend and maintain total system for a total of **20 years** (ageing test is available on request).

3. Fire extinguishing system

Integrator shall include a detailed design of the fire extinguishing system and submitted a complete proposal for all control equipment and any other components needed and/or requested that are required for correct operation of the total system i.e. Control Panel, repeater panel, detectors, alarms, cables, aerosol generator extinguishing units, connecting boxes, abort switch etc.
Integrator should included a complete proposal including chemical quantities required for total flooding (gr.), covered area/s (m³), number of extinguishing units (pcs), generator connecting boxes (pcs.) and cables (mtrs.).

4. Acceptance Test

Integrator shall demonstrate that the completed system complies with the contract requirement using manufactures approved test procedures and as per **BS EN 12094 & ISO 15779-2 or BS EN 15276-2 or NFPA 1010** for all functional requirements of the project which shall be demonstrated i.e. 1st & 2nd stage alarms, auto /manual activation via lamp test, abort extinguishing etc.

6. Interfacing with fire alarm system

The fire extinguishing control modules and indicating equipment shall be capable of been interfaced with a main addressable or conventional fire alarm control with printer (if available) in the form of separate zones except if otherwise specified elsewhere. The interfacing lines should be fully monitored by the main control and indicating equipment.

2. Extinguishing Control and Indicating Equipment (for each extinguishing area) :

2.1. Compliance

Is manufactured to comply with **BS EN 12094-1** or equivalent standard.

2.2 Construction

The Panel shall be suitable for surface mounting, made of painted sheet metal case with a degree of protection of **IP 2X**. All cable entries shall be provided with dust proof fire seals. All manual controls shall be labeled.

2.3 General

The control and indicating equipment shall accept and process signals from automatic fire detectors & manual call points.

2.4 Control of Extinguishing Zones :

Gas Aerosol release shall be initiated:

- a.) Panel shall be equipped with a selector switch for **MANUAL ONLY** as per **BS EN12094-1 Section 4.23**. This shall be operable by special key. The manual operation shall be effected by a two action, this shall preferably be mounted on the front lid of the control panel (outside the extinguishing sector or near the panel and should be **yellow** in color with a protective cover to avoid inadvertent operation).
- b.) Panel shall be equipped with a Emergency HOLD Device as per **BS EN12094-1 Section 4.20** which shall be provided to prevent actuation of the extinguishing while the emergency hold device is continuously operated. The pre-discharge warning time shall be re-started from the beginning by each release of the emergency hold. This shall be operable by a push button and should be **green** in color .
- c.) Coincidence & Manual operation of Extinguishing i.e. **MANUAL & AUTO** as referred in **BS EN12094-1**.

Output circuits

- d.) Two distinguished sounder's for **STAGE 1** (pre-alarm) and **STAGE 2** (discharge alarm).
- e.) The Aerosol Fire Extinguishing Generators connected to the Extinguishing circuit are to be connected in **parallel** to each other for the safe activation, the modules will allow *full commissioning for each Extinguishing Generator* independently, that also *prevents open or short circuits* during activation and the impulse current for activation will not exceed **3 seconds**.

Alarm condition requirements

Energization of a decision element shall result to:

- a.) an output to the sounder circuits and operation of the control panel internal and external sounders.
- b.) a visible indication for the zone in which an element has operated.

c.) the transmission of signal to the fire brigade or other communication equipment.

2.6 Silencing

It shall be possible for sounders and internal buzzer to be silenced via manually operated switches.

Operation of either or both of the silencing switches shall not cancel the responses specified in clause 2.5.(b),(c).

While the alarm devices are silenced and audible signal shall be given at the panel. This may be the same with the fault warning but different from any fire alarm sounder.

2.7 Resetting from alarm condition

The various alarm responses shall be reset via a suitable biased switch. This shall not operate unless the alarms are previously silenced.

2.8 Fault Warning Condition Requirements

2.8.1 *Fault warning shall be given by the following:*

- a. an audible warning from a sounder situated within the panel.
- b. a visible indication.
- c. a visible indication of the faulted zone (for zone faults).
- d. a visible indication for sounder circuits faults.
- e. a visible indication for zone open circuit and short circuit fault.
- f. a signal for remote indication of the fault.

2.8.2 There shall be provision for the manual silencing of the fault warning sounder.

2.8.3 *Fault monitoring*

The following faults shall be monitored:

- (a) supply line short circuit or disconnection, or total loss of power.
- (b) battery short circuit or disconnection or low voltage.
- (c) battery charger short circuit or disconnection.
- (d) short circuit or disconnection of detector / call points leads.
- (e) removal of any detector or call point (removal of any detectors(s) from the circuit should not affect the operation of any manual call point).
- (f) short circuit or disconnection of any leads to fire alarm devices (sounders).
- (g) short circuit on disconnection of any leads to an interfaced extinguishing panel.
- (h) fuse rupture or operation of any protective devices.

2.9 Manual starting of sounders

A facility shall be provided for starting or restarting the fire alarm devices. This shall not depend on the state of the silencing switches.

2.10 Control panel internal buzzer

The control and indicating equipment buzzer shall have a sound level of 80 dB at 1 m.

2.11 Visual indicators

- a. fire alarm indicators shall be red.
- b. indicators of fault shall be yellow.
- c. indicators mains ON / healthy shall be green.
- d. indication of fire and fault shall be given by at least two separate light – emitting indicators.
- e. detection and fault indications shall be given.

2.12 Detectors

All components shall be of high quality to CE or equivalent standard approved i.e. **BS EN 54-7**, suitable for their purpose.

2.13 Marking

The front face of the equipment shall be clearly marked with the following information:

- a. the number and date of the relevant Standard, i.e. **BS EN12094** or equivalent (specify).
- b. the name of the manufacturer or supplier.
- c. the type, number or other designation.

2.14 Output circuits

- a. two independent sounders circuits of total current **1A** or **1.5 times** the current required by the sounders of the system which ever is greater.
- b. a remote transmission output for the transmission of 2 stage signals to the brigade. This shall be suitable to drive an auto-dialing unit.
- c. fire and fault outputs for the remote transmission of signals (audible / visible).

2.15 Call points

Manual call points shall be of high quality to CE i.e. **BS EN54 -11** if applicable.

2.16 *Indicator's test*

It shall be possible during routine testing to ensure that visual indicators operate, by means of a test button.

3. **Functional Tests & Operating instructions / Area Zoning.**

The sequence of testing will be conducted as per **BS EN 12094-1 Section 9.2** on completion and during commissioning.

In addition, the extinguishing circuit integrity will also be tested via lamp test for *each Aerosol Fire Extinguishing Generator* when connected to the circuit in *parallel*, which in turn also protects against **over load, open or short circuits** during activation.

When the Aerosol fire Extinguishing Generators are connected in *series*, commissioning can be carried out but only one closed circuit only and offers **NO** protection against **open or short circuits** during activation of Generators.

An optional **maintenance agreement** can be offered for a 5, 10, 15 and 20 years.

4. **Signs outside the protected extinguishing area:**

“SYSTEM OPERATED” illuminated sign **DO NOT ENTER** at door entrance with *time delay* displayed on panel must be facilitated or added to the panel.

5. **Aerosol Total Flooding Modular System**

- 5.1 Aerosol quantity will be calculated based on the design concentration proposed by the aerosol manufacturer at approx. **20°C**, plus compensation for leakage.
The aerosol outlet temperatures will not exceed **75°C at 30 cm** from outlet as referred in **ISO 15779-2 or EN 15276:2000(E) or NFPA 2010** for Condensed Aerosol.
- 5.2 The system shall comprise of a number of wall mounted Aerosol Generators (Extinguishers) with **Generator Connecting Boxes** which allows the connecting of the Fire Extinguishing Units in parallel which will also safe guard against **over load, open or short circuits** during activation and with an impulse current of 1 Amp. not exceeding 3 seconds.
- 5.3 Integrator shall seek the approval of the Civil Defence after installation of the system if required.
- 5.4 Chemical Extinguishing Type

The tendered Aerosol Fire Extinguishing Agent is suitable for extinguishing fires of Electronic data, Hosting servers, Transformers, Generator stations, Switching cabinets, Control stations, Sub-stations, Power generators, Turbines and Machine rooms etc. The Aerosol Fire Extinguishing agent is designed for extinguishing fires of solid flammable materials, flammable liquids, machinery and electrical equipment of 20 kV and can be effective up to 132 kV on request (more quantity of extinguishing agent is required in gr/m^3). The offered extinguishing agent has **zero ozone depletion potential, non toxic, no decrease in oxygen levels, no release of dangerous substances during storage, no pressurized metal casing**; documentation and test results to confirm the above is available on request.

5.5 Chemical Quantity required

Aerosol quantity should be calculated based on the designed concentration proposed by the Chemical Aerosol Manufacturer design concentration (test results are available on request) is 67 gr/m³ plus compensation for leakages.

The Integrator must estimated and proposed with the tender the Chemical quantities required based on room actual dimensions (detailed calculations to be submitted). For the purpose of formulating a common basis for tender, the gross volume of the room has been taken in to consideration.

A written statement of achieved concentration will be provided by Alltec Co. Ltd. after completion of the installation and on request. The Gas Aerosol particles size shall **NOT exceed 4 μ** and would therefore will not affect electronic data.

5.6 Discharge Time

A suitable flow rate to allow discharge of agent within the time proposed by the manufacturer and will be within the standard limits as stipulated in **NFPA 2010 or EN 15276 i.e.** will not exceed **90 seconds**.

5.7 Containers

- 6.1 Containers will be placed high and be securely fitted to wall or roof.
- 6.2 Containers are constructed of metal stainless steel.
- 6.3 The following tender information is provided for each extinguishing zone.

5.8 Chemical information

The following additional information is available on request :

- a.) Composition.
- b.) Principle of operation.
- c.) Oxygen depletion.
- d.) Atmospheric lifetime.
- e.) Toxicity/No Observed Adverse Effect Level (N.O.A.E.L.)
- f.) Global warming potential
- g.) Safety precautions to be taken not described in this specification.

5.9 Approvals / Certifications for all equipment used :

- a.) The Extinguishing Aerosol Generators is to be a HALON alternative and in compliance to the **ISO 15779-2 or BS EN 15276 or NFPA 2010**.
- b.) Manufactures are Certified with **ISO 9001:2000** certified by SINCERT, LPCB & BSI.
- c.) Tests results from a European Notified Body or European Accredited Authority reflecting that the Aerosol Generators has a distance of not more than **30 cm.**, were the aerosol outlet temperatures will not to exceed **75 °C** for occupied area's for persons as

per EU or US Directives i.e. **ISO 15779-2** or **BS EN 15276** or **NFPA 2010**, OCE test report is available on request.

- d.) Tests results from a European Notified Body or European Accredited Authority reflecting it's efficiency to extinguish fires of Class A & B were the Aerosol density required is only **67 gr. / m³**.
- e.) Tests results from a European Notified Body or European Accredited Authority reflecting no significant change of oxygen levels during & after release of Aerosol in protected space.
- f.) Toxicology reports by a European Notified Body or European Accredited Authority.
- g.) Tests results from a European Notified Body or European Accredited Authority reflecting that the Aerosol Fire Extinguishing Generators must NOT self activate at below **250 °C** in an idle state.
- h.) Test results/certifications from **BSI, OCE, TESI, LPCB, SIPE NOBEL, RINA and SAPIENZA etc.** ARE available on request.
- i.) All Panels, Detectors, Sirens, Call Points are all LPCB Tested and Certified.

5.10 Technical Characteristics

Concentration in volume (not including corrective factors) :	not more than 67,0 gr./m ³ .
Duration of discharge	: not more than 90 secs.
Aerosol Temperature at 30 cm from Generator outlet	: must not exceed 75°C.
Duration of Effectiveness	: 30 -120 min.
Activation Time	: immediately.
Aerosol Stream Length	: Not more than 4 mtrs.
Starting methods	: Electrically only.
Operation conditions:	
- temperature range, °C	: - 30 to + 60°C.
- relative humidity at 25 °C	: up to 98 %
Life time, year	: 20 years.

Electrical characteristics of the Aerosol Fire Extinguishing Generators :

* minimum / maximum starting current	: 800 mA / 2 Amp.
* monitoring current	: not more than 5 mA.

5.11 Physical Characteristics

- The Aerosol Extinguishing agent is **not dangerous** for the human organism.
- The Aerosol Extinguishing agent is **not Toxic**.
- The Aerosol Extinguishing agent is **not Explosive and not flammable under 380°C**.
- After the release of Aerosol extinguishing agent, will **not damage the earth ozone layer**.
- Prevents **re-ignition** after release of extinguishing media.
- The Aerosol Extinguishing agent is **not corrosive** and therefore **does not damage** contents in protected area including computer equipment.
- The Aerosol Extinguishing agent are **not** contained in dangerous **pressurized cylinders**.

- Protects & Extinguishes fires of electrical installations of up to **20,000 Volts i.e. Di-electric.**
- The mass of the Aerosol charge required to extinguish the fire is only **67 gr/m³.**
- Effectively extinguishes fires of **Class A & B** (except for spaces where explosive mixture is present).
- Aerosol Generators (Extinguishers) are **not** classified as a **pyrotechnic.**
- **No significant change of oxygen** content in the protected space on and after activation of aerosol extinguishers.
- **Environmentally friendly.**
- **Chemically neutral.**
- The Aerosol Fire Extinguishing Generators have a minimum **5 year Warrantee.**
- The Aerosol Fire Extinguishing Generators have a **20 year life** (please attached ageing test).

5.12 Alltec Co. Ltd. with the Integrator shall be responsible for identifying:

- (a) Openings in walls, floors should be taken in to consideration
 - (b) Entrance doors into the room that need to be fitted with self-closing return mechanism and
 - (c) Sliding doors that need to be replaced entirely with an approved type.
- And making appropriate recommendations to the employer.

6. System's Power Supply

6.1 The control and indicating equipment shall be normally mains supplied. A stand-by power supply consisting of a secondary battery equipment shall be provided to be immediately available in the event of failure of the main supply. This shall either an integral part of the control and indicating equipment or a separate unit which must be manufactured to comply with **EN 54 – 4.**

6.2 Input voltage

The power supply shall maintain the fire alarm system in normal operating condition, in the event of fault or fire, and with a mains voltage variation of + 10% - 15% of the nominal voltage 230V, 50/60 Hz. The customer shall be responsible to supply a 230 V supply point with the aid of switch via MCB at the main extinguishing control panel.

6.3 Charging time

The charging equipment shall be capable of charging the battery to 85% of its rated capacity in 48 hrs.

6.4 Duration of stand-by supply

The stand-by supply will be capable of maintaining the fully loaded system (including Auto dialing unit) in operation for 48-72 h after which sufficient capacity should remain to provide operation for the alarm, sounders (full alarm load) for at least 30 minutes. A battery deterioration factor should be included to the manufacturer recommendation, but not less than 10%. Battery capacity, power supply and charging equipment rating should be stated at 7-12 Ah. Maximum current drawn from batteries when the main is disconnected is 3 Amps

6.5 Battery life

Batteries will have an expected life exceeding 2 years.

Information will be submitted indicating the expected life and conditions considered.

7. Automatic Detectors

7.1 All detectors shall be detachable (plug in type). The base shall be suitable for smoke or temperature detectors.

Each detector shall be provided with an alarm indicating lamp. It shall be possible to connect in parallel an additional external response visible indicator. Design and construction shall ensure a false alarm free operation due to light, dust, insects, foreign bodies or other disturbances described in the relevant standard.

7.2. Optical smoke detectors

7.2.1 Compliance

Ionization chamber smoke detectors and optical smoke detectors shall comply with **EN54 - 7** or equivalent and approved.

7.2.2 General

7.2.2.1 Voltage range: The widest range formed by the limits of +10%, - 15% of the nominal power supply voltage and the maximum power supply voltage range.

7.2.2.2 Quiescent current: to be stated

7.2.3 Marking

Each detector shall be marked with:

- (a) the number of standard (i.e. EN54-7);
- (b) manufacturers trade mark;
- (c) type number.

7.3 Heat detectors

7.3.1 Compliance

Heat detectors shall comply with or **EN54 - 5** or equivalent and approved.

7.3.2 General

- (a) as required in clause 2.2
- (b) Quiescent current: to be stated.

7.3.3 Principle of operation

Heat detectors shall operate with the rate of rise of heat principle. In addition they shall operate at a maximum air temperature of not more than 60⁰ C except if otherwise specified elsewhere.

7.3.4 Marking

- (a) the number of the relevant standard ;
- (b) manufacturer's trade mark;
- (c) performance grading (grade 1)

7.3.5 Fixed temperature detectors: shall operate at a temperature of about 75⁰C.

8. Fire Alarm Sounders

Fire alarm sounders shall have a pulse or continuous sound, and be red in color.

Audibility : 92 dB (A) at 1m.

Frequency : 500 – 1,000 Hz

Enclosure : Metal or fire retardant synthetic material.

9. End of line resistors

Zone end (E.O.L.) resistors should be connected where applicable. The position of all E.O.L. resistors should be clearly indicated on drawings.

10. Operating instructions / Area Zoning

A set of the Fire Detection System, Fire Extinguishing Control and Indicating Equipment basic operating and daily and weekly testing instructions, in English, and building and protected area diagrams clearly indicating detectors and zoning should be placed near the Control and Indicating Equipment. These shall be placed in glass front wooden or aluminum frames.

11. Mains supplied equipment

All necessary work required for the connection of mains operating equipment shall be carried out by the integrator. All such equipment shall be supplied, except, if otherwise stated on drawings, from the floor's Main Distribution Board and be controlled by means of an isolating fused spur unit. The cover of such isolating protective device shall be colored red and labeled "FIRE ALARM SYSTEM": DO NOT SWITCH OFF'. This shall be enclosed in a security closed box with transparent hinged cover. Any other device controlling the equipment should be fixed to the floor's Main Distribution Board reading: "WARNING: THIS SWITCH ALSO CONTROLS THE SUPPLY TO THE FIRE ALARM SYSTEM".

12. Wiring

12.1 Wiring shall be installed in PVC conduit and where this is not possible in PVC trucking. Cables of the fire alarm system (except type **CWZ to BS 6387**) should be segregated from cables of other system. Unenclosed cables that should be segregated from cables of other services trucking and surface conduits should be labeled 'FIRE ALARM'.

12.2 Cables for prolonged operation

Cables used for the interconnection of (a) control and indicating equipment; (b) sounders, power supplies and remote indication and transmission equipment; (c) remote transmission equipment and telephone distribution cases should be fully screened against electrical interference and should

- i. comply with BS: 6387 meeting at least the requirements for categorization as CWZ low smoke, zero halogen and shall be LPCB approved or
- ii. be in accordance with the requirements of **BS: 5838: Part 1**, 1988 Paragraph 17.6 – Alternative cables (for prolonged operation)- and at least equivalent to the cable in (i).

12.3 The cross sectional area of all cables to be used should clearly indicated. However, this should be at least 1.5 mm².

12.5. Manufacturers data – Test Certificate

All tenders are required to submit at stage of tendering all necessary manufacturers data to prove the compliance of the cables offered for prolonged operation with the requirements of 12.2 (i) or (ii). Test certificates shall be submitted on request with cable by the successful tender.

13. Trucking

1. Shall be constructed of high impact, non-flame propagating non-toxic PVC, with double locking clip on lid Fixing on walls or ceiling shall be by screws or rivets.
2. Capacity: Such that a space factor of 45 % is not exceeded.
Compliance: With **BS 4678: Part4** or equivalent and approved.
3. The trucking standard accessories shall be used at angles, tees, Joints, ends (end caps) and other points of discontinuity.