SUMMARY
Fire Detection and Alarm Systems

This document is a summary of the various documents by which Fire Alarms and Detection Systems are designed and installed. Where clauses are referred in the various standards, they are the actual clause numbers, but the language has been summarised. This document does not replace knowledge of the actual standards. The documents referred to are:

- **Building Code of Australia – as amended**
- **AS I670 - Fire detection, warning, control & intercom systems - System design and install.**
- **AS1851 - Maintenance of fire equipment**
- **AS4428 - Fire detection and alarm systems (to be obsolete)**
- **AS7240 - Fire detection and alarm systems**

International Context - The World Trade Organisation (WTO) deals with global trade between nations, ensuring that trade flows as smoothly and freely as possible. Australia was a founding member.

The Agreement on Technical Barriers to Trade (TBT) is one legal texts of the WTO Agreement. TBT obliges Members to ensure that technical regulations and standards do not create unnecessary obstacles to trade. Where international standards exist members must use them, as a basis for the standards they develop, except where such standards represent fundamental problems. International Organization for Standardization (ISO) is the largest developer and of International Standards. The WTO uses ISO to reduce technical barriers to trade. Australia is represented on International bodies, and adopts ISO Standards where possible in line with obligations under the WTO agreement.

Building Code of Australia (BCA) was reviewed in 2004. AS7240 was introduced so that the Australian would meet ISO 7240. There has been a delay while manufacturers developed the products to comply with AS7240. It is expected that AS4428 will be removed from the BCA in 2015 or soon thereafter. At that time panels will need to comply with AS7240. Existing panels will not be required to be updated but support for these products will be withdrawn over time.

The Fire Brigade Interface standard (AS4428.3) has provided an interruption to the process. The FPA Australia technical committee TAC/2 resolved to support the withdrawal of AS4428.1 by no earlier than 5 years after the publication of the revised AS4428.3. This revision was published on the 28 October 2010 and hence AS4428.1 is expected to remain till at least 2015.

AS1670.1 after revision is likely to state that the committee intends to withdraw AS4428.1 5 years from the publication of the revised AS1670.1. The withdrawal date however may be determined by Standard Australia based upon the publishing of AS4428.3-2010 i.e. after 2015. These dates will be confirmed in due course.

AS1670-1 Fire detection and control systems - System design installation - Fire.

2.1 COMPONENTS to be selected and located to achieve stable and reliable performance. Product to be certified by a registered testing authority as defined in the BCA.

2.2 SEPARATION OF SYSTEMS - the fire detection system shall be independent of any building monitoring and control systems. Alarm and fault signals shall be displayed independently of the building monitoring and control system. Controls that form part of an associated systems, including: fire suppression systems; air handling systems; or occupant warning systems as required by Clause 3.22; may be housed within the CIE enclosure, provided they are segregated.

2.3 DESIGNATED ENTRY POINT - A designated building entry point shall be identified for each building.

2.4 An alarm zone shall be limited 2000 m² floor area with no entrances to adjacent areas being separated by more than 10 m and visible from each other. Maximum devices in an alarm zone shall not exceed 40.

2.5 Addressable circuits must be capable of: all faults to be reported; any circuit fault shall not disable more than 40 devices on the addressable circuit. An addressable circuit serving 10 story or more than a 20,000m² floor area shall have two separate cable paths, each protected to WSX2. An addressable circuit shall not have more than 1,000 devices of any type.

2.6 DISTRIBUTED SYSTEMS - Subindicator panels (SIP) - shall be:
(a) Connected to the FIP as separate alarm zone and be monitored for alarm, fault, isolate and power

supply failure. Any fault shall be indicated as a zone fault at the FIP.

(b) Connected directly to the FIP and not via any other SIP.
(c) FIP indications of SIP events shall clear when they are reset or restored at the SIP.
(d) Multiple SIPs mounted adjacent to each other, shall be considered as a single SIP.
(e) SIPs with more than 250 devices shall be connected to the FIP using two separate signal paths.
(f) Fault on one of the paths from the SIP shall not prevent an alarm on the other path.
(g) Fault between FIP and SIP shall indicate at FIP, if SIP has more than 250 devices also indicate at SIP.
(h) Short circuit in the signal path between the FIP and SIPs shall indicate as a fault the FIP.
(i) An SIP shall be powered from the building in which it is located
(j) SIP shall be capable of stand-alone operation.

2.6.2 Distributed CIE with more than 40 devices shall be connected to the FIP using two signal paths. Also:
(a) Any signal path or, power supply fault, shall indicate as a fault at the FIP.
(b) A single signal path or a power supply line fault shall stop an alarm from more than 40 devices.

2.6.3 Signal path fault shall be indicated audibly and by a LED suitably labelled, or by the common fault LED.

3.3 Dependency on more than one alarm signal (alarm verification facility). The following shall not be subject to dependency on more than one alarm signal:
(a) Manual call points.
(b) Subindicator panels.
(c) Detectors used to activate fire suppression systems.
(d) Detectors installed in hazardous areas.
(e) Fire suppression systems.
(f) Optical beam-type smoke detectors where a beam-interrupt fault overrides the alarm state.
(g) Alarm zones containing fixed temperature (static) response heat detectors only.
(h) Equipment using other confirmation methods, dual zone or alarm acknowledgement facility.
(i) Detection algorithms that will cause a delay in the detector alarm response of more than 60 s.
(j) Detectors that may take more than 60 s to become functional after a reset.

3.4 Alterations to installations. Where cables are joined outside the CIE, they shall be in an enclosure and labelled 'FIRE ALARM' in a contrasting color with lettering size of not less than 5 mm.

3.6 Control of ancillary devices shall be protected to prevent a fault on the external wiring from ancillary control facilities inhibiting the operation of other CIE functions or the transmission of an alarm signal.

3.6.2 Fire suppression system activation - Each ancillary device circuit used to activate a fire suppression system shall be supervised. Faults shall cause the CIE to initiate an audible and visible fault indication.

3.8 External Alarm Indication shall operate a strobe to indicate alarm be located on the outside of the designated building entry point. 'FIRE' shall be marked on or near the strobe in letters not less than 25mm height on a contrasting background. The strobe shall be connected to a supervised circuit on CIE.

3.9 Systems connected to fire dispatch center, the FIP shall be visible and accessible at building entry point. Systems not using fire dispatch center, FIP shall be visible and accessible for the authorized persons. Indicators and controls to not less than 750mm or more than 1850mm from the floor.

3.9.2 If FIP panel is behind a door, door shall be marked 'FIRE PANEL' in letters not less than 50mm high. The door shall have no other marking, not be lockable nor reduce the CIE sound level below requirement.

3.9.3 Remote location - Where FIP is mounted in a remotely located control point acceptable to the regulatory authority, a mimic panel, repeater panel or fire brigade panel shall be installed at the designated building entry point. This panel shall identify the location of the FIP.

3.9.4 Clearance shall be provided to access FIP. Fire fan control panel and sound systems for emergency purposes may be installed adjacent to the FIP.

3.10 ZONE BLOCK PLAN - of the installation, with the position of the FIP clearly indicated, shall be securely mounted adjacent to the FIP, mimic panel, repeater panel and fire brigade panel.

3.12 The alarm output from the suppression system shall be a separate alarm zone at the CIE. Where the suppression system connection to the monitoring service provider is via the FIP, the signal path protection shall comply with WS51W, with the mechanical rating upgraded dependent on the hazard.

3.14 INTERMIXING of actuating devices on alarm zone circuits is permitted, provided they are compatible.

3.15 MANUAL CALL POINT shall be installed in a visible and accessible location inside the main entrance area of the building. May locate on any CIE within this area. The operation of a manual call point shall not extinguish a previously lit detector indicator.

3.16 Primary power source shall be reliable source of supply. The secondary power source shall consist of rechargeable stationary batteries.

3.16.4 Battery capacity shall be capable, in the event of failure of the primary power source, of maintaining the system quiescent condition for at least 72h, and then being able to operate two worst case alarm zones for 30min. If the power supply failure is externally monitored, the 72h requirement may reduce to 24h. A new battery shall be at least 125% of the calculated capacity requirements.

3.16.6 Ancillary devices external to the enclosure shall be installed within an enclosure and shall be marked or labelled with the words 'FIRE ALARM SYSTEM'. Normally energized ancillary loads, such as door holders, may be disconnected in the event of failure of the primary power source.

3.18.3 Wiring of a single path between the alarm signal equipment and the telecommunication service point shall have a minimum rating of WS51W, and the rating upgraded dependent on the hazard. Where connection to the monitoring service provider is duplicated, the minimum rating to be WSX1 and the rating upgraded dependent on the hazard.

3.20 SUBINDICATOR PANEL shall only serve areas on one level of a building unless—

(a) That SIP serves the entire building;
(b) All zones connected to the SIP are readily accessible without leaving the area served by the SIP; or
(c) Location of zones in alarm at the SIP can be identified at the designated building entry point.

Where the SIP serves the entire building it shall be installed in accordance with the requirements for an FIP. If the SIP serves a specific area it shall be located at the main point of entry into that area.

3.22 OCCUPANT WARNING shall be provided to alert all building occupants to a fire alarm situation. The warning system shall be one of the following:

(a) A sound system (AS1670.4), initiated by the fire detection system.
(b) Electronic sounders producing the evacuation signal (with or without verbal message).
(c) Tactile emergency evacuation signals.
(d) Where evacuation signal is required arouse sleeping occupants, special consideration required.
(e) Where occupants must not be subject to stress imposed by loud noises system should be arranged to warn the staff and minimize patient trauma.
(f) The sounders shall be connected to a supervised output at the CIE.

3.24.3 Cables, all conductors shall be stranded and insulated. Two core cables used for extra low voltage shall have a minimum of 0.75mm^2 for each conductor. Some exceptions allowed

3.24.4 Cable color for extra low voltage, the outer sheath of a cable shall be red.

3.27 FIRE BRIGADE PANEL - where the CIE is connected to the fire brigade dispatch center, and does not have individual zone alarm indicators, it shall have a fire brigade panel complying with AS 4428.3. If fire brigade panel is installed, the FIP is not required to be located at the designated building entry point.

7.1 COMMISSIONING - the system. Equipment - check that equipment is suitable and is compatible with other components. Installation - check that the equipment has been located, installed in accordance with the documentation. Check functionality of all aspects of the system.

7.2 Documentation shall be housed in or adjacent to the FIP. Documentation shall be provided: 'as-installed' drawings showing the location of all equipment installed, including unique detector numbering; manuals; commissioning report and installer's statement.

7.3 System log should include:

- Identification of the building
- Description of the system components and their location
- Commissioning data
- Type, quantity, capacity of batteries required
- Date of battery installation and replacement dates
- Battery discharge capacity compensation factor at full load
- Quiescent current of the fire detection system
- Alarm load current of the fire detection and alarm system
- Quantity, type, location for all external to the FIP
- Ancillary loads and that of any other connected
- Minimum operating voltage of all connected
- Power supply equipment primary supply rating

APPX B FIRE RATED WIRING SYSTEMS

B1 All wiring systems required to have a fire rating of not less than 120 min.

B2 Protection against mechanical damage shall be provided. Details of grade of protection are in AS 3013.

APPX E COMMISSIONING TEST REPORT format

APPX F STANDARD FORM OF INSTALLER'S STATEMENT FOR FIRE ALARM SYSTEM format

AS1670-4 Fire detection and control systems - System design, installation - Sound Systems.

AS1670-6 Fire detection and control systems - System design, installation - Smoke alarms.

AS1851-6 Maintenance of fire equipment - Automatic fire detection and alarm systems.

6.2 All fire detection and alarm systems shall be Inspected and tested on a monthly basis.

6.2.2 Prior to commencing, take precautions as to not adversely affect the normal operation of any system except for those systems to be maintained or to adversely affect occupants of the building, or to cause any situation that will cause an unwanted alarm. Inform the responsible entity or nominated person that service is to be carried out. Notify the monitoring provider where testing or service may cause signals to be transmitted. On completion of any testing or service, return all controls to their prior state. When any function is left impaired, disabled or is not restored to 'normal', it shall be recorded in the system logbook and the owner or agent shall be notified.

6.2.5 Service records of activities and results shall be kept.

6.2.6 Reports Critical defect and yearly condition reports shall be prepared and distributed.

6.3 The frequency of servicing of systems shall be (Clause 6.4); Monthly; Six-monthly; Yearly; Five-yearly.

6.4.1.2 **Monthly service of fire detection alarm and special hazard systems** requirements Table 6.4.1.2.

External alarm	Inspect the external alarm ensure it indicates designated building entry point.
Control indicating equipment ()	Inspect all CIE ensure that it is visible, accessible and free from dust and debris.
Battery enclosure	Inspect the battery enclosure for corrosion.
Fire alarm	Simulate alarm, confirm all indicators operate and external alarm is activated.
Occupant warning system	Simulate an alarm and confirm the alarm initiates the warning system.
Isolate/Disable	Initiate isolate/disable at the FIP, confirm that indications operate.
Filament visual indicators	Test the operation of each filament type visual indicators.
Zone block plan	Inspect zone block plans ensure they are securely mounted and legible.
Baseline data	Check that baseline data is available and legible.

6.4.1.3 **Six monthly service for fire detection alarm and special hazard systems** requirements Table 6.4.1.3.

Monthly service	Complete all monthly service activities, as listed in Table 6.4.1.2.
Local control station (LCS)	Ensure that they are visible, accessible and free from dust and debris.
Visual warning devices	Inspect all visual warning devices for any condition that would affect function.
Local control station (LCS) discharge inhibit switch	Test each switch and confirm it operates correctly: it prevents the discharge of suppression system; stops and resets the discharge sequence; causes indictor at LCS and FIP; does not override the operation of the manual discharge switch.
Local control station (LCS) manual initiate switch	Test the switch and confirm normal discharge sequence, including alarms, delays, shutdowns, and that it overrides the LCS discharge inhibit switch.
System inoperative warning device	Confirm the device operates for: service switch; fault in discharge actuator

	circuit; lock-off valve; inhibit switch; any isolation/fault in any part of system.
System operation and logic	Test system logic (e.g. dual detector operation) and confirm operation is in accordance with design: VWDs; audible alarms; directional valve signal/output; system discharge actuator; equipment fire mode signal/output; ancillary controls; HVAC fire mode signal/output; door and damper release
Actuator circuit faults	Test each supervised actuator circuit to ensure a fault is registered at the FIP.
Actuator	Test each actuator and check operation. Isolate to stop unintended discharge.

6.4.1.4 **Yearly service for fire detection alarm and special hazard systems** requirements Table 6.4.1.4.

Complete all monthly and six-monthly service activities, as per Table 6.4.1.2 and 6.4.1.3.

Manual call points	Check manual call points are in good condition. Test all manual call points.
Other warning devices	Inspect all to ensure that they are in place, and working correctly.
Switches / keypads	Test the operation of each control.
Visual indicators	Test the operation of each visual indicator and alphanumeric displays.
Battery	Measure quiescent and maximum alarm currents. Calculate the required capacity and Check installed batteries are appropriate. Verify baseline data.
Fire Detectors	Test detectors confirm correct alarm zone indication. Where the detectors are part of special hazards systems test 100% of the detectors.
Audibility	Test warning system and check the signals are distinctly audible in all areas.
Occupant warning system sound pressure level	Measure the sound level from at least one point for each amplifier used and ensure at each point the value is consistent with the baseline sound level.
Alarm acknowledgement facility	Test 20% of installed alarm facilities so that after 5-year period, all are tested.
Alarm investigation facility	Test the alarm investigation facility if enabled and check it functions.
Batteries condition	If battery is more than 2 years old, carry out a battery discharge test.
Service life	Inspect any items having a defined service life and report.
Baseline data	Confirm the baseline data is accurate.
Protected areas survey	Survey building, check for: change or damage; detection and indicators are suitable; any conditions that may cause unintentional operation; cables, conduits; ensure components properly mounted and secure.
Interfaced system initiation	Simulate alarm(s) to verify that each interface initiates the corresponding system(s) in accordance with the design.

SMOKE HAZARD MANAGEMENT SYSTEMS – Take precautions to prevent unacceptable ventilation changes.

FFCP latching and reset	Check that signal from the FIP, the FFCP remains in fire mode until reset on FFCP.
Manual override controls	Check that manual override ON-AUTO-OFF control operates. Manual override should function in normal mode and fire mode.
Airflow fault indicator	Check the operation of the airflow fault indicator
Circuit fault indicator	Check the operation of the air-handling equipment cable circuit fault indicator.
Electrical	Check the operation of the electricity phase- fail fault indicator.
Fan-running indicator	Check the operation of the fan-running indicator.
Fan-stopped indicator	Check the operation of the fan-stopped indicator.
Fan fault indicator	Check the operation of the fan-fault indicator.

SPECIAL HAZARD SYSTEMS – Take precautions to prevent the discharge of system during these tests.

Status monitoring	Test the system monitor (e.g. pressure switches) Check function indicator at FIP.
Suppression valves	Simulate system operation and confirm that each directional valve operates.
Discharge time delay	Test the system discharge sequence and confirm the time delay period.
Agent release indicator	Test agent release device, confirm that the release is indicated at FIP.

6.4.1.5 **Five yearly service of fire detection alarm and special hazard systems** requirements Table 6.4.1.5.

Complete all monthly, six-monthly and yearly service activities, as in Tables 6.4.1.2, 6.4.1.3 and 6.4.1.4.

Supervised circuits	Test each supervised circuit ensure a fault is registered at the FIP.
Addressable short circuit isolators	Test to verify that max of 40 devices are disabled by a single short circuit.
Power supply supervision	Create power supply fault, Confirm receipt by monitoring service provider.
Collective detection circuits	For each collective fire detection circuit, REMOVE the last detector or device on the circuit and confirm that a fault signal is registered at the CIE.
Interface and control test	Conduct a test with each system and Check that each interfaced system responds to the signal in accordance with the approved design.
Occupant warning system speaker circuits	Measure impedance of each loud speaker circuit and verify it has not more than ±15% from the last test nor exceeded the output in the baseline data.

Monitoring connection	Test that monitoring links is indicated at the monitored site.
Alarm verification facility	Test one detector of each type per circuit with alarm verification facility enabled to check that it functions in accordance with the approved design.

6.4.2 **Smoke and heat alarm - Six-monthly service Inspection, service** requirements Table 6.4.2.2.

Smoke and heat alarms	Inspect all alarms check condition for deposition of dust or paint.
Battery missing indication	Inspect alarms to ensure that 'battery missing indicator' has not operated.
Mains power on indicator	Inspect that the mains power on indicator is illuminated.
Alarm test	Activate the alarm test function and check the audible indication.
Other warning devices	Inspect all devices to ensure that they are in place, and operating correctly.

6.4.2.3 **Yearly service, test, and survey for smoke and heat alarms** requirements Table 6.4.2.3.

Six-monthly service	Complete all six-monthly service activities, as listed in Table 6.4.2.2.
Interconnecting alarms	Test the activation of each alarm operates the audible alarm in other alarms.
Smoke alarms and Heat Alarms	Test 100% of alarms – Clean each alarm.
Other warning devices	Test all devices to ensure that they are functioning correctly.
Batteries	Check for battery replacement and replace the battery if required.
Service life	REPLACE smoke alarms and heat alarms where the service life date is exceeded.
Survey-Spacing and location	Inspect each alarm to ensure spacing and location in accordance with design.

6.4.3 **Emergency warning systems - Monthly service Inspection, test,** and survey requirements Table 6.4.3.1.

Baseline data	Inspect baseline data is available and legible.
Zone Block plan	Inspect zone block plans to ensure that they are securely mounted and legible.
Control and indicating Equipment	Inspect the, and ensure that it is, accessible and free from dust and debris.
Battery enclosure	Inspect the battery enclosure for corrosion.
Emergency warning system test	Simulate alarm and confirm that the required warning signal operate.

6.4.3.2 **Yearly service Inspection, test, and survey for emergency warning systems** requirements Table 6.4.3.2.

Monthly service	Complete all monthly service activities, as listed in Table 6.4.3.1.
Emergency call points	Inspect and Test the operation of each emergency call point.
Visual warning devices (VWDs)	Inspect for conditions that could affect operation. Test each device
Other warning devices	Inspect all to ensure that they are in place and ensure operating correctly.
As-installed drawings	Inspect the as-installed drawings to ensure the plan is legible and current.
Warning system initiation	Simulate alarm via the fire system with warning system in automatic mode.
Fault	Simulate a circuit faults for each circuit and confirm indicator EWP and FIP.
Aural indicators	Test or confirm the operation of the aural indicators as required.
Panel switches and keypads	Test the operation of each control.
Fault	Create a fault between the FIP and the EWP, confirm indicators at EWP and FIP.
Visual indicators	Test the operation of each visual indicator and alphanumeric displays.
Nominal battery capacity	Measure system quiescent and alarm currents. Calculate the required capacity and Check the battery is no less than the required capacity.
Ancillary controls	Test operation of ancillary functions and ensure that each can be operated.
Audibility test	Test Emergency system and check that are distinctly audible in all areas.
Override test	Confirm that the alarm signal overrides non- emergency audible signals.
Interface and control test	CONDUCT a test with interfaced fire systems. Check functions in accordance with the system interface diagram for the building.
Batteries	If battery is more than 2 years old carrying out a battery discharge test.
Survey change of structure	Inspect building to ensure any changes are not likely to affect evacuation.
Change of occupancy or use	Inspect building to ensure changes and their effect on the system.

6.4.3.3 **Five yearly service, test, and survey for emergency warning systems** requirements Table 6.4.3.3.

Complete all monthly and yearly service activities, as listed in Tables 6.4.3.1 and 6.4.3.2.

Speech intelligibility	Test to ensure intelligibility in all areas of the building.
Sound pressure level	Measure sound level from at least one reference point for each amplifier used and ensure at each point the value is consistent with the reference sound level.
Emergency warning system speaker circuits	Measure the impedance of each speaker circuit, check it has not changed by more than 15% from the last test or exceeded the baseline data for amplifier.

6.4.4 **Emergency intercom systems - Yearly service Inspection, test, and survey** requirements Table 6.4.4.1.

Baseline data	Inspect that baseline data is available and legible.
Emergency intercom equipment	Inspect to ensure that it is visible, accessible and free from dust and debris.
Visual indicators	Test the operation of visual indicators and alphanumeric displays.
Aural indicators	Test the operation of the aural indicators.
Switches and keypads	Test the operation of each required control (e.g. secondary control panels).
Fault	Simulate WIP circuit fault condition and confirm the fault indicator at panel.
Reset	Test the operation of the reset function.
Warden indicator and controls	Check the operation of each warden indicator and controls.
Warden intercom points (WIPs)	Inspect all WIPs ensure they are visible and accessible.
Stand-alone system (battery enclosure)	Inspect the battery enclosure for evidence of corrosion.
Outgoing WIPs function test	Initiate each WIP and confirm that each WIP is indicating correctly and that clear communication is possible with the intercom panel operator.
WIPs all call address	Select the all-call address function and Check that the visual indicator for all WIP phones activate. Check that the address is heard at all WIP phones.
Stand-alone system Battery capacity	Measure system quiescence and alarm currents. Calculate the required capacity and Check the installed battery is no less than required capacity.
System interface	CONDUCT a functional test with any interfaced systems.
Stand-alone system (battery condition)	When the battery has not been replaced in the previous two years, verify the battery condition by carrying out a battery discharge test.
Survey—Change of structure	Ensure structural changes have occurred to change zones.
Change of occupancy or use	Ensure occupancy has not affected the audibility in accordance with the design.
WIP locations	Inspect all evacuation zones to ensure at least one WIP is installed.

AS 7240-1 **Fire detection and alarm systems (ISO 7240-1).** Standard applies for systems for buildings. Not mandatory for applications such as mines and shipping, and special hazards.

2.4 System not to be affected by other systems, or be rendered inoperative by fire before a fire is detected.

2.6 Compatibly of system components must be tested to ensure satisfactory operation of the system.

2.7 Any fault should not result in more faults in the system, or create other hazards outside the system

AS 7240-2 **Control and indicating equipment (CIE) (ISO 7240-2) requirements:**

5 Must be capable of indicating, quiescent, fire alarm, supervisory signal, fault, disablement, test conditions. Have indication that power is supplied.

7.1 Must be capable of receiving signals from multiple zones, separately. Alarm within 10 secs of signal.

7.2 alarm condition shall be indicated without manual intervention. Must indicate visible general alarm, separately indicate each zone, must have audible alarm.

7.4 audible indication must be capable of be silenced by separate control. Audible indication shall re-sound for each new zone in alarm.

7.6 shall be capable of being reset from the fire alarm condition, Access level 2.

7.8 May have provision to automatically transmit to alarm signaling devices. Must be possible to silence alarm devices at access level 2, following silence it shall possible to re-sound devices at access level 2. Devices shall not be silenced automatically.

7.9 May have provision for routing to/from fire alarm routing equipment. The signals shall be indicated by separate LED or alpha numeric display. Signals shall remain visible until alarm condition is reset.

7.10 May have outputs/inputs for transmission of fire alarm signals for automatic protection equipment. Indicator to be common to equipment and not suppressed during alarm condition.

7.11 Delays to outputs may be provided. If so then selectable access Level 3. Delay can be overridden by access level 1 or from manual call point. Delay to one signal shall not affect activation of other outputs.

7.12 Dependency on more than one alarm system, is configurable access level 3.

7.14 Output of Standard Emergency evacuation signal from CIE is mandatory. Shall be possible to silence, and also possible to re-sound.

9.1 Fault Warning Conditions must be simultaneously recognised for all faults, unless prevented by fire alarm signal, and must occur within 100 secs of fault detection.

9.2 Short circuit or interruptions require separate indicators, other faults may use the general fault warning indicator. An audible alarm is also required, this may be silenced access level 1 or 2. The CIE shall have a fault output which can signal the fault warning. Reset of faults is via access level 2.

10 Disabled condition can only be made by access level 2. When disabled other mandatory functions are not affected. Each zone or addressable point mush be able to disabled independently. This is not to be affected by system reset function. An indication must be visible for any disabled zones or addressable points. If an addressable point is disabled within a zone then the zone must also indicate disabled.

11 Test Condition may be included processing and indication of alarms signals from zones. To place the alarm in test requires access level 2 or 3. Zones not in test mode will operate as normal. Under tests outputs to other devices shall be disabled. Test conditions shall be indicated visibly, at a zone level.

12 May include standardized Input / output Interface. If provided shall have: alarm condition; zones in alarm; alarm routing equipment; fault warning; zone indication, and other functions.

13 Manufacturer to provide manual and user information. Technical specifications to permit assessment of compatibility to other components. Installation information including, environmental limitations, mounting instructions, connections, configuration, commissioning, and maintenance.

13.6 Access to Indications and controls to 4 levels.

Access level 1	Mandatory indications shall be visible - members of the general public.
Access level 2	Restricted by procedure - trained persons to operate the CIE
Access level 3	Restricted by procedure, different from access level 2 - authorized to configure or maintain using instructions.
Access level 4	Restricted by special means which are not part of the CIE – trained and authorized to maintain CIE or alter firmware.

14 Software to monitor and fault reporting required to be stored in continuous, unmaintained state capable of running for minimum of 10 years. Access to software from access Level 4.

15 The CIE shall identify the standard, name of manufacturer, and serial number via access level 2.

ISO 7240-3 Audible alarm devices

AS 7240-4 Power supply equipment (ISO 7240-4) mandatory functions.

4.2.6 Must change to secondary power supply if main fails automatically.

4.2.7 Must indicate that main power has failed, no other change on panel or system.

4.2.9 Where failure of one supply shall not cause failure of other power source of failure of system.

5.2.2 Battery used then must have safety mechanism to prevent explosion.

5.3.1 Battery charger must be automatic, and charge to 80% of capacity within 24h and 100% within 72hrs.

5.4 Power supply equipment must recognise faults within 100sec of occurrence for, reduction of voltage from main source; loss of standby power; reduction of battery voltage to less than 90%, and reduction of charge output to less than 90% of required.

5.5 Power supply equipment to include a facility to check the function of the battery.

6.2.3 Power supply equipment, fuses, and calibration only accessible at level 3 Access, using tool or key.

6.2.4 Where power supply separate, the same access requirements as 6.2.3, need tool or key.

6.2.5 All manual controls, fuses, and calibration to be marked.

6.4 Where power supply equipment is separate from Control Panel then 2 transmission paths for power to control panel, such that if one path broken then no interruption to the supply of power to control panel.

8 Power supply equipment marked with standards name and manufacturer model and type.

AS 7240-5	**Point-type heat detectors (ISO 7240-5)** Testing protocol for Heat detectors.
ISO 7240-6	**Carbon monoxide fire detectors using electro-chemical cells**
AS 7240-7	**Point-type smoke detectors (ISO 7240-4) -** Testing protocol for Smoke detectors.
ISO 7240-8	**Point-type fire detectors using a carbon monoxide sensor in combination with a heat sensor**
ISO 7240-9	**Test fires for fire detectors**
ISO 7240-10	**Point-type flame detectors**
ISO 7240-11	**Manual call points**
ISO 7240-12	**Line type smoke detectors using a transmitted optical beam**
AS 7240-13	**Compatibility assessment of System Components (ISO 7240-13) -** Protocol for compatibility.
ISO 7240-14	**Design, installation, commissioning and service of detection and alarm systems in and around buildings**
ISO 7240-15	**Point-type fire detectors using smoke and heat sensors**
ISO 7240-16	**Sound system control and indicating equipment**
ISO 7240-17	**Short-circuit isolators**
ISO 7240-18	**Input/output devices**
ISO 7240-19	**Design, installation, commissioning and service of sound systems for emergency purposes**
ISO 7240-20	**Aspirating smoke detectors**
ISO 7240-21	**Routing equipment**
ISO 7240-22	**Smoke-detection equipment for ducts**
ISO 7240-23	**Visual alarm devices**
ISO 7240-24	**Sound-system loudspeakers**
ISO 7240-25	**Components using radio transmission paths**
ISO 7240-27	**Point-type fire detectors using a scattered-light, transmitted-light or ionization smoke sensor, an electrochemical-cell carbon-monoxide sensor and a heat sensor**
ISO 7240-28	**Fire protection control equipment**
ISO 7240-29	**Part 29: Video fire detectors**
ISO 8201	**Acoustics - Audible and other emergency evacuation signals**
ISO 12239	**Smoke alarms using scattered light, transmitted light or ionization**