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STANDARD
OF CANADA

CAN/ULC-S524:2014-AMD1
(Including Amendment 1)

STANDARD FOR INSTALLATION OF FIRE ALARM SYSTEMS

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AMENDMENT NOTICE

ULC STANDARDS

STANDARD FOR INSTALLATION OF FIRE ALARM SYSTEMS	CAN/ULC-S524:2014
AMENDMENT 1	JANUARY 2016

The following amendments are being incorporated into CAN/ULC-S524:2014:

1. Revised Clause 4.2.1.1 and added a Note to permit wireless source of power supply consistent with Clause 4.6.3(D).

2. Revised Subsection 4.2.3, Emergency Power Supply, by revising Clause 4.2.3.2 and adding new Clauses 4.2.3.3 and 4.2.3.4, to be consistent with CAN/ULC-S527-11 Amendment 1, Standard for Control Units for Fire Alarm Systems, which allows for 4 h battery supervisory capacity.

3. Revised Clause 4.3.1.8 and added a new Clause 4.3.1.9, under Subsection 4.3, Electrical Supervision and 4.3.1, General, to further explain the electrical supervision requirements in Subsection 10.2.4, Field Device Power Buss Fault Isolator. Subsequent Clauses are renumbered, including the cross references therein.

4. Added new Clause 4.4.10 under Subsection 4.4, Wiring, and renumbered subsequent Clauses. Revised similar Clause 4.5.9 and added new Clause 4.5.10 under Subsection 4.5, Optical Fibre Cables, for clarity.

5. Clarified the criteria for Large Scale Network Systems, by revising Clause 5.8.1 under Subsection 5.8, Large Scale Network Systems, and the explanatory note in Appendix A, Clause A5.8.1, Campus Style Network.

6. Revised Clauses 5.8.5 to be consistent with CAN/ULC-S527-11 Amendment 1 for large scale networks.

7. Clarified Clauses 5.8.6 and 5.8.9 (now 5.8.10) to require stand-alone alternate page location only for high rise *buildings* as defined by the National Building Code of Canada.

8. Added a new Clause 5.8.7 to more adequately address the requirement to request, grant or deny control by a display and control centre. This Clause aligns with the existing requirement in CAN/ULC-S527-11 Amendment 1. Subsequent Clauses are renumbered.

9. Added new Clause 7.1.13, under Section 7, General Requirements of Fire Alarm System Devices, and Subsection 7.1, General, to require labels for supporting field devices.

10. Revised Clauses 8.2.3.1 and 8.2.3.2 and deleted Clause 8.2.3.3, under Subsection 8.2.3, Mounting of Fire Detectors, as well as the title of Figure 6, for consistency and clarity.

11. Added new Clause 8.3.4.3 under Subsection 8.3.4, Galleries, Mezzanine and Interior Balconies and new Figure 18.1 to better illustrate the requirement.

12. Added a new Subsection 8.3.14, Elevator and Dumbwaiter Shafts (Hoistways) under Subsection 8.3, Spot Type Fire Detectors, to expand the requirement contained in Clause 8.2.2.5.

13. Added the word “Locations” to the title of Subsection 9.2 to more accurately describe its contents.

14. Added a new Clause 9.4.19 and Note under Subsection 9.4, Visible Signal Devices (Strobe Lights) to provide detailed strobe intensity for devices installed in residential sleeping rooms. Revised Clause 9.4.1 to reference Clause 9.4.19.

15. Revised wording of, and added Notes in, Clause 10.2.1.3 under Subsection 10.2, Fault Isolators and 10.2.1, Field Device Data Fault Isolators, for greater clarity.

16. Revised Clause 10.2.4.1 under Subsection 10.2.4, Field Device Power Buss Fault Isolators, to correct the reference to Figures 33.1 to 33.4 into new Figure 33.5 instead.

17. Added a Note under Subsection 10.2.6, Suite Fault Isolators, and reference a new Appendix Note under Appendix A (Informative), Explanatory Materials, Clause A10.2.6, with its included Figure, to clarify wiring configurations for suite fault isolators.

18. Transferred Subsection 8.9, Fire Suppression Systems to a new Section 12, renamed, FIRE SUPPRESSION RELEASING SYSTEMS, to clarify and add new requirements.

    18.1 Added a new Subsection 12.1, General. Revised the title of previous Subsection 8.9.2 into new Subsection 12.3, Alarm Initiating Devices and Supervisory Devices for Suppression Systems.

    18.2 Added new Clause 12.3.1 and renumbered the rest of the Clauses and Subsections, including Appendix notes under Appendix A.

    18.3 Revised renumbered Clause 12.3.2 (formerly Clause 8.9.2.1), to clarify that covers only apply to certain alarm initiating devices.

    18.4 Revised Clauses 12.3.11 and 12.3.12, to reference new Figure 31.1.

    18.5 Revised wording of renumbered Clause 12.3.13 (formerly clause 8.9.2.12) for clarity. Renumbered Figure 31 to Figure 31.2 and revised the reference clause.

    18.6 Added new Subsections, 12.4, Notification Devices for Suppression Systems with explanatory note in Appendix A, Clause A12.4.4.

    18.7 Added new two new Subsections 12.5, Releasing Stations for Suppression Systems; and 12.6, Releasing Panels for Suppression Systems.

    18.8 Revised the reference clauses in Table 2 and Appendix F.

19. Revised Figures 2.4 and 2.6 to correctly illustrate the functions and features.

20. Revised Figures 21, Spacing of Spot Type Heat Detectors for Beam Construction, and Figure 24, Detector Spacing of Spot Type Smoke Detectors, to provide an isometric view for the spacing of spot type heat detectors and to correctly reflect the related Clauses.

21. Added new Figure 31.1 to illustrate the requirements in previous Clauses 8.9.2.10 and 8.9.2.11, now renumbered to Clauses 12.3.11 and 12.3.12 under Subsection 12.3, Alarm Initiating Devices and Supervisory Devices for Suppression Systems.

22. Renumbered Figure 31 to 31.2 and revised the reference Clause to 12.3.13.

23. Added new Figure 33.5, Installation of Power Buss Fault Isolator Serving Field Devices, to illustrate the requirement in Clause 10.2.4.1.

24. Created new Appendix Subsection A4.2.3.3, Uninterruptible Power Supplies (UPS) under Appendix A (Informative), Explanatory Materials, to provide guidance for installation of UPS and battery chargers.

25. Revised explanatory note in Appendix A, Clauses A5.8.1 and A5.8.7, to provide greater clarity.

26. Added four new Figures in Appendix A (Informative) Clause A10.2.6 on Examples of Wiring Configuration for Residential Notification Devices, to illustrate the requirement in Subsection 10.2.6-Note, Suite Fault Isolators.

NOTICE

PLEASE NOTE THAT THIS STANDARD INCLUDES AN AMENDMENT. THE CURRENT EDITION OF THIS STANDARD IS NOT VALID UNLESS USED TOGETHER WITH THE AMENDMENT.

IT IS POSSIBLE, HOWEVER, THAT CERTAIN CODES WILL REFER TO THE SUPERSEDED EDITION OF THIS STANDARD, WITHOUT THE AMENDMENT. IN THOSE INSTANCES, THE COMPILATION OF THIS DOCUMENT ALLOWS FOR REFERENCE TO BE MADE TO THE STANDARD PRIOR TO THE INCLUSION OF THE AMENDMENT.

AMENDMENT 1

4.2 POWER SUPPLY

4.2.1 General

4.2.1.1 Two independent power supplies shall be provided for the *fire alarm system*; one primary and one emergency, in accordance with the National Building Code of Canada.

NOTE: Battery operated wireless *field devices* in compliance with Subsection 4.6, Short-Range Radio Frequency Equipment (Wireless), are permitted to use the *field device* battery as the only source of power.

4.2.3 Emergency Power Supply

4.2.3.1 — *No change.* —

4.2.3.2 Where a *distributed type system* or *remote power supplies* are provided, with an internal battery in each *control unit*, *transponder* or *remote power supply*, and the battery provides supervisory capacity as specified in Clauses 4.2.3.3 and 4.2.3.4, the primary power may be taken from an essential *emergency power supply* if the fire alarm circuit is protected by separate over-current protectors and identified in accordance with CSA C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Section 32. A label shall be installed at the main source with the following or similar wording:

A "The fire alarm system power is supplied from the essential emergency power supply"; and/or

B "L'alimentation du système d'alarme provient de l'alimentation de secours".

4.2.3.3 When batteries are used for *emergency power supply*, they shall be sized to meet the following requirements:

A 24 h of standby battery power plus the duration of rated alarm load if *emergency power supply* is provided entirely by the batteries; or

B 4 h of standby battery power plus the duration of rated alarm load if *emergency power supply* is provided by an engine-driven generator.

NOTE: Where uninterrupted power supplies (UPS) are installed, refer to Appendix A (Informative), Explanatory Material, Clause A4.2.3.3.

4.2.3.4 The duration of the rated alarm load as described in Clause 4.2.3.3, shall be as required by the National Building Code of Canada.

4.3 ELECTRICAL SUPERVISION

4.3.1 General

4.3.1.8 Except as permitted in Clauses 4.3.1.10 and 4.3.1.11, where a power buss serves more than one National Building Code of Canada required fire alarm zone:

A A single fault (open circuit fault, short circuit fault or ground fault) shall not prevent the normal operation of input or output field devices in more than one National Building Code of Canada required fire alarm zone; and

B Shall comply with the same requirements as described in Clause 4.3.1.9.

NOTE: Refer to Appendix A (Informative) Explanatory Materials, Clause A4.3.1.8.

4.3.1.9 In Class A power buss, the primary wiring circuit and the alternate wiring circuit shall be installed in separate raceways or cable assemblies having a minimum separation of 300 mm where the cables are installed vertically and 1200 mm where the cables are installed horizontally (Refer to Figure 1.1), except under the following conditions:

A Single conduit/raceway not exceeding 3000 mm in length to enclosures for control units, transponders, annunciators, display and control centres or remote power supplies. (Refer to Figure 1.2);

B Single conduit/raceway drops to individual field devices (Refer to Figure 1.3); or

C Single conduit/raceway drops to multiple field devices installed within a single room not exceeding 100 m2 in area (Refer to Figure 1.4).

4.3.1.10 Except as permitted in Clause 4.3.1.11, where an audio buss serves more than one National Building Code of Canada required fire alarm zone, a single fault (open circuit fault, short circuit fault or ground fault) shall not prevent the normal operation of input or output field devices in more than one National Building Code of Canada required fire alarm zone.

4.3.1.11 Where equipment for control units or transponders is installed in multiple enclosures within the same room, wiring between these enclosures need not be electrically supervised where installed in metallic raceways not exceeding 18 m in length.

4.3.1.12 Where a power buss serves supporting field devices which are located within a common National Building Code of Canada required fire alarm zone but serve other National Building Code of Canada required fire alarm zones, the power buss segment serving these supporting devices is not required to comply with Clause 4.3.1.8.

4.3.1.13 Class A circuit with fault isolators installed in accordance with Subsection 10.2, Fault Isolators, or an equivalent method, shall be utilized to meet the requirements of Clauses 4.3.1.10and 4.3.1.11.

NOTE: For data communication links, refer to Subsection 5.7.3, Field Device Data Communication Link.

4.4 WIRING

4.4.10 Where cables leave a building, non-current carrying conductive components shall be bonded as per CSA C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Section 26.

4.4.11 When using shielded cable, the shield shall be:

A Continuous and isolated from ground through all junction boxes;

B Bonded in accordance with the manufacturer’s published installation instructions; and

C Independent.

NOTE 1: Independent means the shields for groups of cables should not be commonly connected.

NOTE 2: The reason for this requirement is to prevent multiple ground loops that can disrupt proper system communications.

4.4.12 Shielded cable assemblies used for data communication links located in the same raceway shall each have a separate shielded wiring cable assembly unless individually shielded within a multiple conductor cable assembly.

4.4.13 Ancillary circuits shall not be used to activate circuits of a voltage level greater than 30 V directly within the control unit or transponder. Multiple voltage relays or devices, mounted external to the control unit or transponder, shall be utilized to activate circuits of a voltage level greater than 30 V.

4.5 OPTICAL FIBRE CABLES

4.5.9 Where electrically conductive lines, including an electrical conductive component of an *optical fibre cable*, leave a *building*, lightning arrestors and/or bonding shall be provided in accordance with CSA C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Sections 26 and 56, and surge arrestor protection as per the manufacturer's published installation instructions.

4.5.10 Where optical fibre cables leave a *building*, non-current carrying conductive components shall be grounded in accordance with CSA C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Sections 26 and 56.

5.8 LARGE SCALE NETWORK SYSTEMS

NOTE: Refer to Appendix A (Informative) Explanatory Materials, Clause A5.8, Campus Style Network, for good engineering practices or design guidance where these systems are applied to campus style network.

5.8.1 *Fire alarm systems* that utilize more than one *control unit* or *transponder* and meet one or more of the following criteria, shall comply with the requirements of this Subsection:

A Contains more than 1000 total active *field devices*, *supporting field devices*, and *fire detectors* (see Appendix A (Informative), explanatory Materials, Clause A5.8.1 with respect to campus style *fire alarm systems*); or

B Are located in a *building* within the scope of Subsection 3.2.6 of the National Building Code of Canada.

5.8.5 Each *control unit* and *transponder* shall have signal silence, reset and trouble silence switches with visual indicators, degraded mode, and stand-alone capability indicators. Except at the primary *display and control centre(s)*, signal silence and reset are only active in degraded and stand-alone mode.

5.8.6 *Buildings* equipped with *voice communication* systems that are required by the National Building Code of Canada, shall have at least one *control unit* or *transponder* in addition to the primary *display and control centre*, incorporating the following:

A Annunciation capability as required by the National Building Code of Canada;

B A means to transmit voice messages (where applicable); and

C A minimum of one ″All Call″ switch to enable voice messages to be transmitted (where applicable).

5.8.7 Where multiple display and control centres incorporate voice alarm features, are provided, the following shall also apply:

A Manual controls and voice alarm features can only be operated from one location at any given time;

B Indication shall be provided continuously displayed at all display and control centres as to which is in control, either by a dedicated indicator or a text message where alphanumeric displays are used;

C Complete loss of communication to the display and control centre shall not inhibit other communicating display and control centres from being able to gain control; and

D Ability to request, grant, or deny system control with provision for fail-safe auto-transfer from one command centre to another shall be provided.

5.8.8 Each *control unit* and *transponder* shall be located in a suitable service room and/or *central alarm and control facility*, separated from the remainder of the *building* by a minimum 1 h fire separation.

NOTE 1: Suitable service rooms may include, but are not limited to, a dedicated fire alarm room, electrical room, telecommunication room or information technology server room, but should not include rooms with significant combustible materials, hazardous equipment or high voltage equipment installations. Refer also to Clause 5.1.9.

NOTE 2: Refer to requirements for the protection of electrical conductors in the National Building Code of Canada. See also Appendix A (Informative) Explanatory Materials, Clause A5.8.8.

NOTE 3: Multiple *control units* or *transponders* installed in the same room within 18 m of each other, which are interconnected to operate as a single unit, may be considered as a single *control unit* or *transponder* to meet the requirement of Clause 5.8.8.

5.8.9 Each *control unit* and *transponder* shall contain audio amplifiers where voice communication capability is provided.

5.8.10 Each *control unit* and *transponder* shall provide *alert* and *alarm signal* tone generators or digitized voice messages as required by the system operation sequence for stand-alone mode operation.

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7 GENERAL REQUIREMENTS OF FIRE ALARM SYSTEM DEVICES

7.1 GENERAL

7.1.13 Each *supporting field device*, regardless of installation location, shall have an identifying label securely attached so that it is visible in the installed position, identifying the system or function served.

Exception: Where a supporting field device serves a single field device, and is installed within the same enclosure as that field device, labelling is not required.

8.2 GENERAL REQUIREMENTS FOR FIRE DETECTORS

8.2.3 Mounting of Spot Type Fire Detectors

8.2.3.1 Spot type *fire detectors* shall be mounted on the ceiling except as otherwise permitted in this Standard.

8.2.3.2 Spot type *fire detectors* may be installed on the wall between 100 mm and 300 mm from the ceiling, measured to the top edge of the detector. (Refer to Figure 6).

8.3 SPOT TYPE FIRE DETECTORS

8.3.4 Galleries, Mezzanine and Interior Balconies

8.3.4.3 *Smoke detectors* installed in compliance with the requirements of Subsection 3.2.4 of the National Building Code shall be installed within 300 mm of the opening through the floor assembly and shall be spaced at a maximum spacing of 4.6 m. Refer to Figure 18.1.

8.3.14 Elevator And Dumbwaiter Shafts (Hoistways)

8.3.14.1 A *fire detector* required in a shaft by the National Building Code of Canada shall be mounted at the highest point of the shaft.

8.3.14.2 *Heat detectors* installed in the bottom of a shaft (pit) shall be mounted between 100 mm and 300 mm below the lowest point of travel of each car within the shaft.

NOTE: *Heat detectors* installed within shafts can be mechanically affixed to a bracket in a ceiling-mounted orientation or mounted in a side wall orientation.

8.3.14.3 In lieu of spot type heat detection, linear heat detection cable installed around the inside perimeter of the shaft enclosure may be used to protect the bottom of a shaft (pit) per Clause 8.3.14.2.

9.1 GENERAL

9.1.7 Except as permitted in Clause 12.4.5, *audible signal devices* within a *building* shall generate similar sounds and sound patterns when activated.

9.2 AUDIBLE SIGNAL DEVICE LOCATIONS

9.4 VISIBLE SIGNAL DEVICES (STROBE LIGHTS)

9.4.1 Except as noted in Clause 9.4.19, the effective luminous intensity of each strobe light shall be rated not less than 15 candela (cd).

9.4.19 Where *visible signal devices* are installed in sleeping rooms, each *visible signal device* shall have a minimum candela rating of 177 cd where the device is installed less than 610 mm from the ceiling and a minimum candela rating of 110 cd for all other locations.

NOTE: The *visible signal device* should be located within 4.87 m of the pillow.

10.2 FAULT ISOLATORS

10.2.1 Field Device Data Fault Isolators

10.2.1.3 Data *fault isolators* required by Clause 10.2.1.2 are not required:

A Between *field devices* located within the same floor area that are monitoring mechanical equipment serving other floor areas; and

NOTE: For example, *water flow devices* on sprinkler systems or duct type *smoke detectors* on HVAC systems serving other floor areas are considered part of the same area specified in Clause 10.2.1.2 and need not be separately fault isolated from other devices within that area.

B Between *field devices* located within the same floor area, that are monitoring equipment on the same floor.

NOTE: For example, fire suppression system within the same floor area that may be separately annunciated need not be separately fault isolated from other devices within that area.

10.2.4 Field Device Power Buss Fault Isolators

10.2.4.1 This Subsection applies to the installation of *power buss fault isolators* as required by Clause 4.3.1.8 for power busses serving *field devices*. (Refer to Figure 33.5.)

NOTE 1: Where available, *power buss fault isolators* should be located in a fire separated electrical room.

NOTE 2: Refer to Appendix A (Informative) Explanatory Materials, Clause 10.2.4.1.

10.2.6 Suite Fault Isolators

10.2.6.1 This Subsection applies to the installation of *suite fault isolators* where provided as one option to meet the requirements of the National Building Code of Canada for notification appliances serving residential or care occupancies.

NOTE 1: Supervision for open circuit, ground fault and short circuit fault shall be maintained in each defined suite where suite fault isolation is used

NOTE 2: Refer to Appendix A (Informative), Explanatory Materials, Clause A10.2.6for alternate methods to comply with the National Building Code of Canada requirements for notification appliances serving residential occupancies.

8.9 FIRE SUPPRESSION SYSTEMS – this subsection has been replaced with new Section 12, and revised. See below.

12 FIRE SUPPRESSION RELEASING SYSTEMS

12.1 GENERAL

12.1.1 Except as detailed within this Section, *fire alarm system* equipment installed for the detection, notification, and control of fire suppression systems shall be installed in accordance with the applicable requirements for *fire alarm systems*, as detailed elsewhere in this Standard.

12.1.2 Each releasing device (e.g., solenoid, relay) and *circuit* provided for use with a fire suppression system releasing shall be electrically supervised.

12.2 FIRE DETECTOR FOR SUPPRESSION RELEASING

12.2.1 In addition to the requirements for *fire detector* spacing detailed elsewhere in the Standard, where two or more *fire detectors* are required to activate for the release of a suppression system, *detector spacing* shall be reduced in accordance with good engineering practice. See Appendix A (Informative) Explanatory Materials, Clause A12.2.1.

NOTE: An alarm initiated by the first *fire detector* shall put the *fire alarm system* in an alarm or alert condition. See Clause 12.3.1.

12.2.2 Where *fire detectors* provided with pre-alarm functions (e.g. laser spot-type *smoke detectors* or air sampling-type detectors) are used for the releasing of suppression systems, the fire detection threshold to activate the release of the suppression system shall be in accordance with good engineering practice. See Appendix A (Informative) Explanatory Materials, Clause A12.2.2.

NOTE: Where *fire detectors* are provided with pre-alarm functions, signaling and annunciation should be in accordance with good engineering practice.

12.3 ALARM INITIATING DEVICES AND SUPERVISORY DEVICES FOR SUPPRESSION SYSTEMS

NOTE: Refer to Appendix F (Informative), Base Building Annunciation for High Value Asset Fire Protection Systems.

12.3.1 Activation of suppression systems shall be annunciated at the base *building fire alarm system*.

NOTE: Where fire detectors are provided with pre-alarm functions, signaling and annunciation shall be in accordance with good engineering practice.

12.3.2 Where alarm initiating devices and *supervisory devices* require adjustment, they shall be installed so as to permit the removal of covers for adjustment purposes.

12.3.3 *Water flow devices* shall be installed to ensure activation within 90 s of water flowing in the system that is equal to or greater than that of a single sprinkler of the smallest orifice size installed on the system. Refer to Appendix A (Informative) Explanatory Materials, Clause A12.3.3.

12.3.4 *Water flow devices* incorporating an adjustable time delay shall be set with a sufficient delay to reduce the possibility of a false indication (e.g. caused by water hammer).

12.3.5 *Supervisory devices* shall be connected to a latching type supervisory circuit of a *control unit* or *transponder*.

12.3.6 *Supervisory devices* shall be wired to allow the circuit operation to differentiate between an open circuit wiring fault and the operation of a device.

12.3.7 A *supervisory device* used to monitor the position of a valve handle, shall be set to operate within two turns of the valve handle or when the stem of the valve has moved 20% of the distance from its normal open position.

12.3.8 A *supervisory device* used to monitor the position of a valve handle, shall remain activated while the valve is in any off-normal position.

12.3.9 Where actuating lever type *supervisory devices* cannot be used, plug type switches may be used, provided:

A The cable is tight when plugged in normal position; and

B The supervisory circuit operates on one-half turn of the valve handle.

12.3.10 Water temperature type *supervisory devices* shall be set to provide an indication of low water temperature that could affect operation of the system. The set temperature shall be suited to site conditions but shall not be any lower than 4 °C.

12.3.11 *Tamper devices*, where utilized with alarm initiating devices, shall be wired so that the activation of the *tamper device* shall cause a *trouble signal* and shall not prevent the reception of an alarm from any alarm initiating device on that *circuit*. Refer to Figure 31.1.

12.3.12 *Tamper devices*, where utilized with *supervisory devices*, shall be wired so that the activation of the *tamper device* shall cause a *trouble signal* and shall not prevent the reception of a supervisory function indication from any *supervisory device* on that circuit. Refer to Figure 31.1.

12.3.13 *Supporting field devices* not installed in fire protection equipment rooms (e.g., sprinkler and fire pump rooms) and not installed in exit stair shafts shall be installed in the same floor area which the fire suppression system devices serve. Refer to Figure 31.2.

12.4 NOTIFICATION DEVICES FOR SUPPRESSION SYSTEMS

12.4.1 Notification devices provided for local notification of fire suppression system operation shall be installed in accordance with the requirements detailed elsewhere in the Standard, as appropriate for the device type.

12.4.2 Notification devices provided to warn occupants within the protected space of the activation of the suppression system shall be installed within the protected space and shall initiate upon activation of the first *fire detector*.

12.4.3 Notification devices provided to warn persons not to enter a protected space due to suppression system activation shall be installed within the protected space and shall initiate upon activation of the first *fire detector*.

12.4.4 Where notification devices to warn occupants to evacuate a protected space and not to enter a protected space are provided, each type of notification device shall provide unique notification. Refer to Appendix A (Informative), Explanatory Materials, Clause A12.4.4.

12.4.5 *Audible signal devices* providing local notification of fire suppression system operation shall produce a sound that is different from the base *building fire alarm system audible signal devices*.

12.4.6 *Visible signal devices* providing local notification of fire suppression system operation shall produce a visual signal that is different from the base *building fire alarm system visible signal devices*, or be labelled or provided with signage to indicate they are unique signal devices.

12.5 RELEASING AND ABORT STATIONS FOR SUPPRESSION SYSTEMS

12.5.1 Releasing stations for manual activation of suppression systems shall be installed in accordance with the appropriate requirements for *manual stations*, as detailed elsewhere in the Standard.

12.5.2 Releasing stations shall be of a unique appearance and colour from base *building fire alarm manual stations*, and shall comply with the requirements of CAN/ULC-S528, Standard for Manual Stations for Fire Alarm Systems, Including Accessories.

12.5.3 Abort stations shall be of a constant pressure type and comply with the requirements of CAN/ULC-S527, Standard for Manual Stations for Control Units for Fire Alarm Systems, Subsection 4.25.2.3, Abort Feature.

12.6 RELEASING PANELS FOR SUPPRESSION SYSTEMS

12.6.1 *Control units* installed to provide releasing service (releasing panels) for fire suppression system operation shall be installed in accordance with the requirements for *control units* and *transponders*, as detailed elsewhere in the Standard.

12.6.2 Releasing panels shall be annunciated for alarm, supervisory, and trouble conditions, as appropriate, at the base *building fire alarm system*.

12.6.3 Where releasing panels are installed in *buildings* not required to be provided with a *fire alarm system*, alarm, supervisory, and trouble conditions shall be annunciated at the releasing panel.

12.6.4 Each releasing panel shall be provided with a physical disconnect switch to allow testing without actuation of the fire suppression system(s) controlled by the releasing panel. Activation of the switch shall cause a non-latching *supervisory signal* on the base *building fire alarm system*.

12.6.5 The sequence of operation for the releasing panel shall be consistent with the requirements of the applicable Codes and Standards for the controlled fire suppression system, and good engineering practices.

TABLE 2

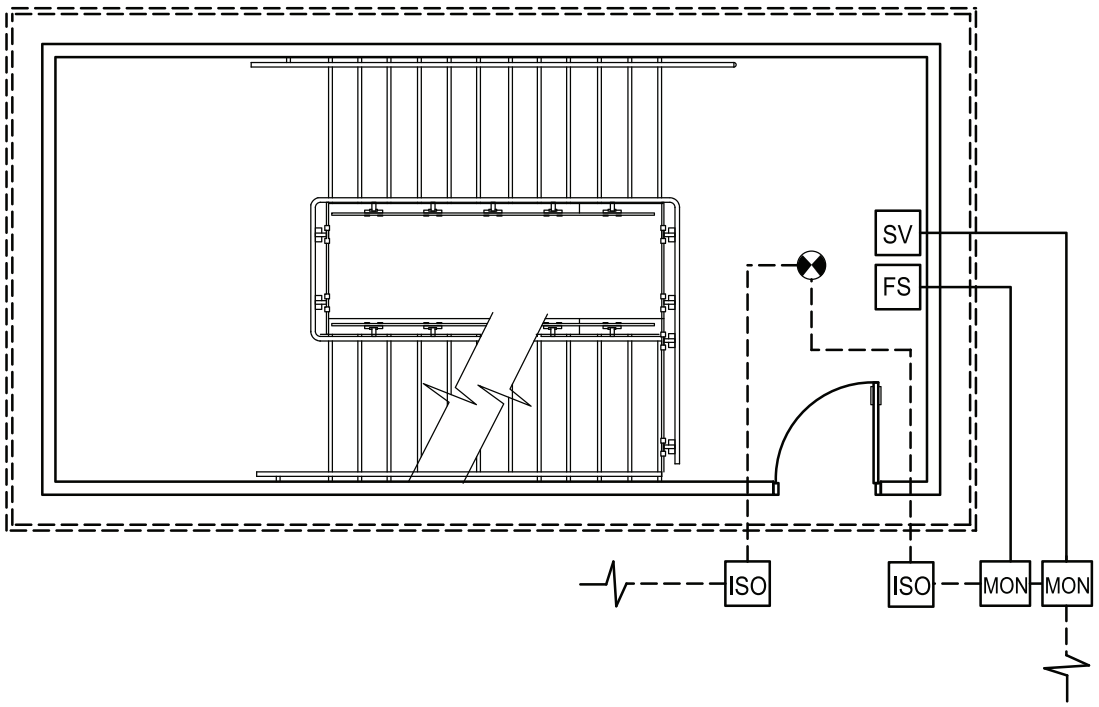
RESPONSE TIMES FOR CONTROL UNITS AND TRANSPONDERS

(Reference: Clauses 4.1.10, 4.1.11, 4.6.6-Note, Clause 5.1.10, Table 3, Clause A12.3.3)

FIGURES

FIGURE 2.4
EXAMPLE OF FAULT ISOLATOR SERVING A SINGLE FIELD DEVICE IN AN EXIT STAIR

(Reference: Clause 5.7.1.1-Note, 10.2.1.9-Note and Table 3)



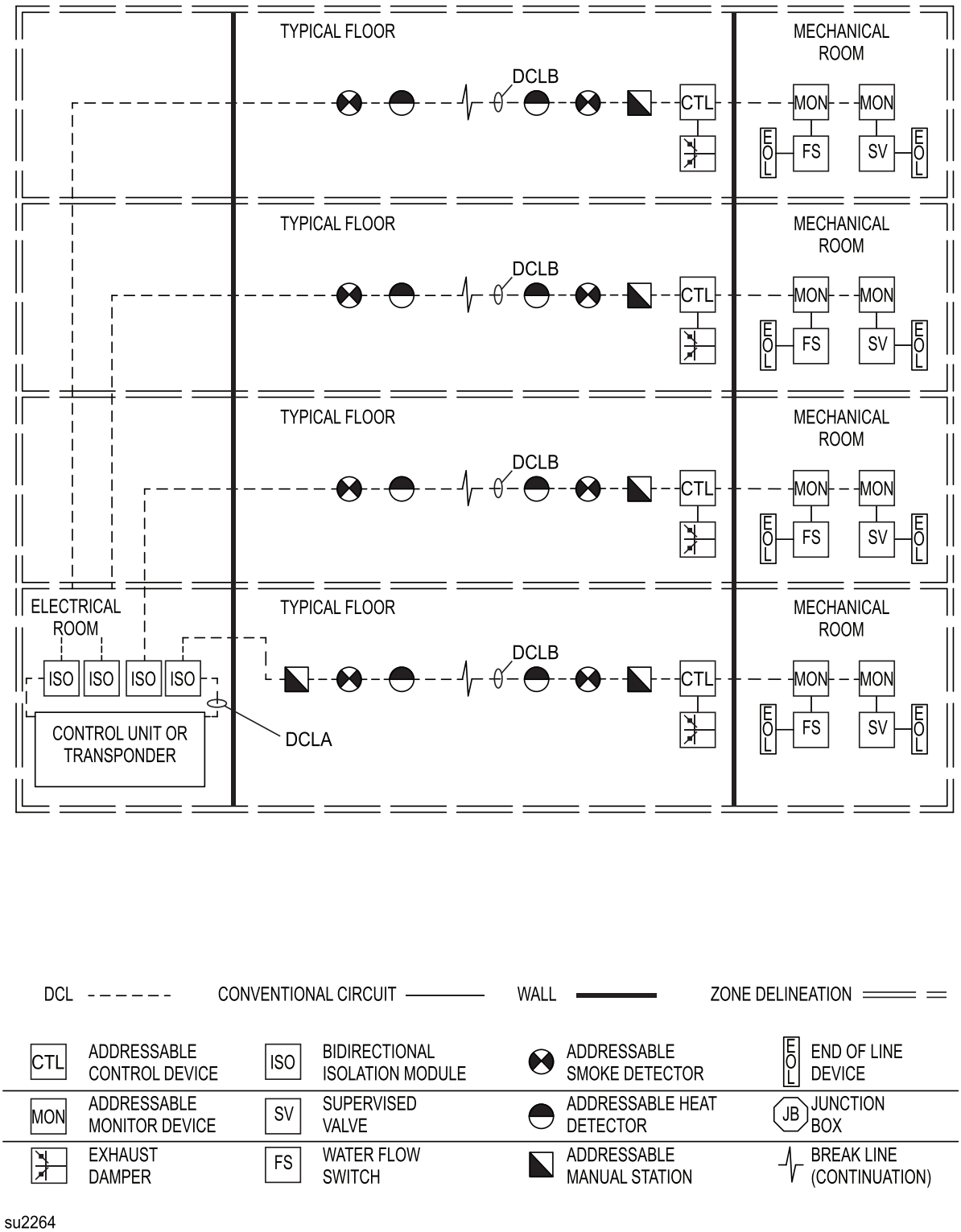
DCLC – – – – CONVENTIONAL CIRCUIT ——— ZONE DELINEATION ═══ =

CTL ADDRESSABLE CONTROL DEVICE	ISO BIDIRECTIONAL ISOLATION MODULE	ADDRESSABLE SMOKE DETECTOR	EOL END OF LINE DEVICE
MON ADDRESSABLE MONITOR DEVICE	SV SUPERVISED VALVE	ADDRESSABLE HEAT DETECTOR	JB JUNCTION BOX
EXHAUST DAMPER	FS WATER FLOW SWITCH	ADDRESSABLE MANUAL STATION	BREAK LINE (CONTINUATION)

su2263

FIGURE 2.6
FLOOR DATA COMMUNICATION LINK B (DCLB) CIRCUITS CONNECTED TO DATA COMMUNICATION LINK A (DCLA) INSTALLED IN A SINGLE FIRE-RATED ELECTRICAL ROOM

(Reference: Clause 5.7.1.1-Note)



su2264

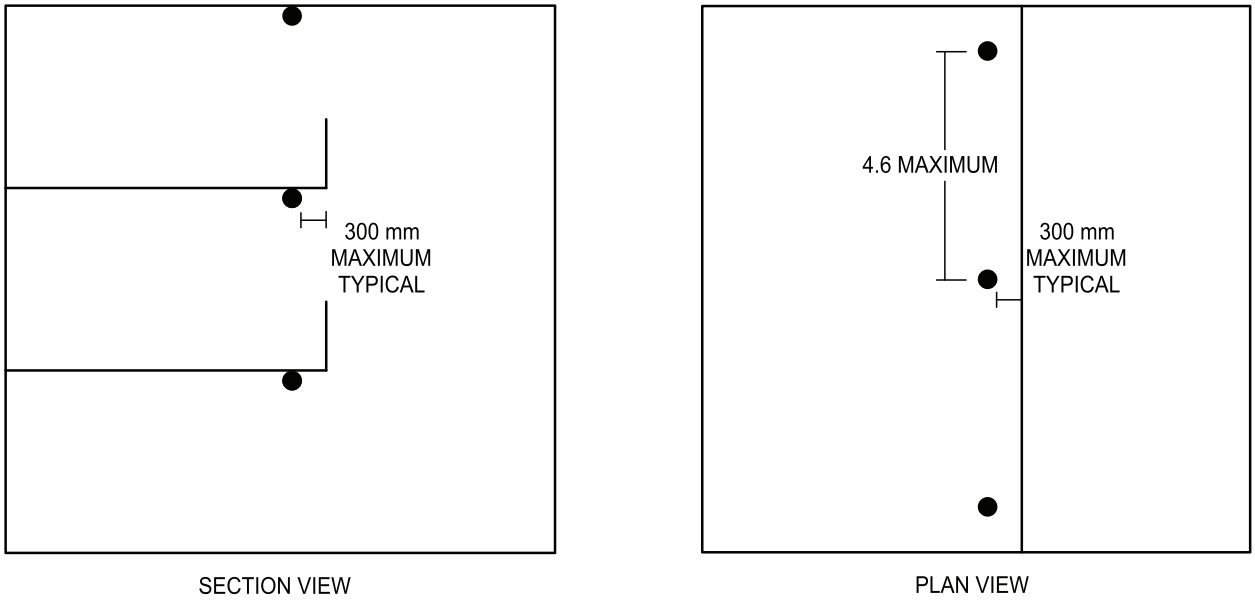
FIGURE 6

INSTALLATION OF SPOT TYPE FIRE DETECTORS

(Reference: Clause 8.2.3.2)

FIGURE 18.1
DETECTOR SPACING OF SMOKE DETECTORS: GALLERIES, MEZZANINE AND INTERIOR BALCONIES

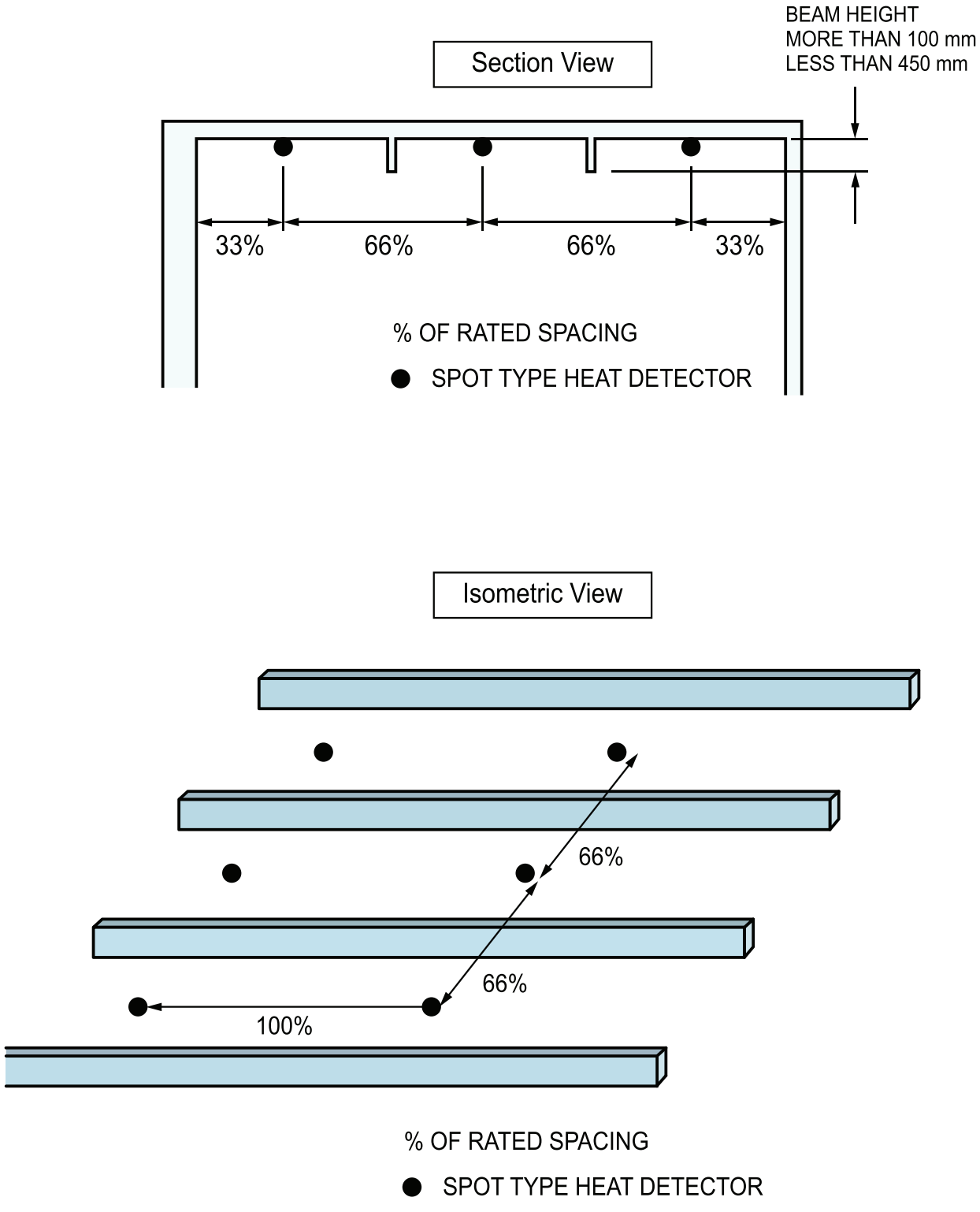
(Reference: Clause 8.3.4.3)



su2262

FIGURE 21
SPACING OF SPOT TYPE HEAT DETECTORS FOR BEAM CONSTRUCTION

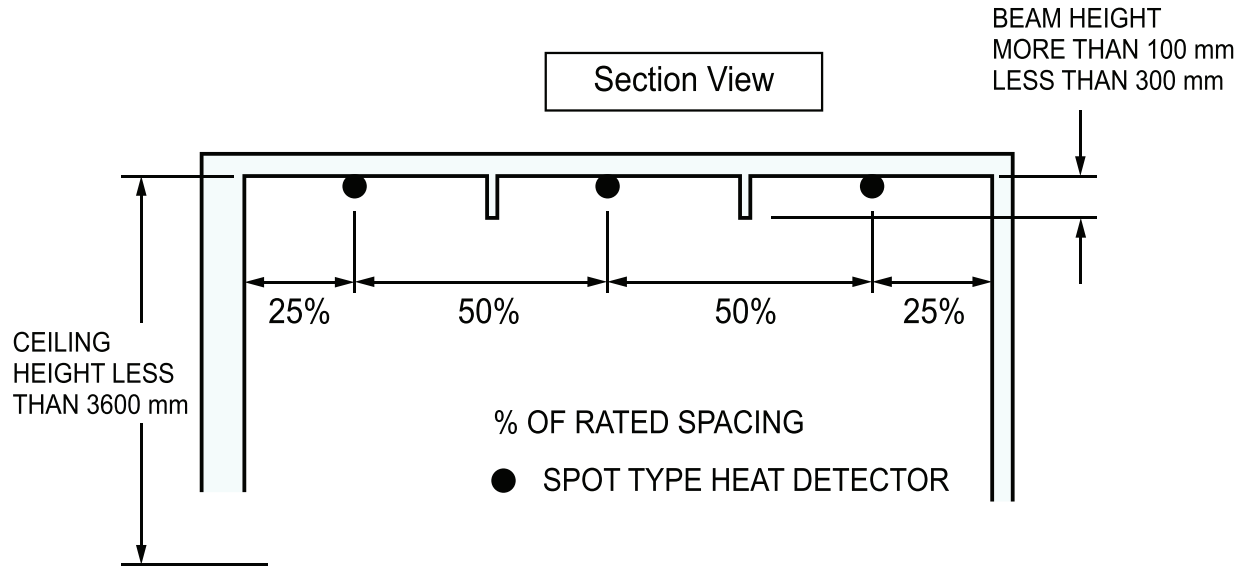
(Reference: Clause 8.3.10.2)

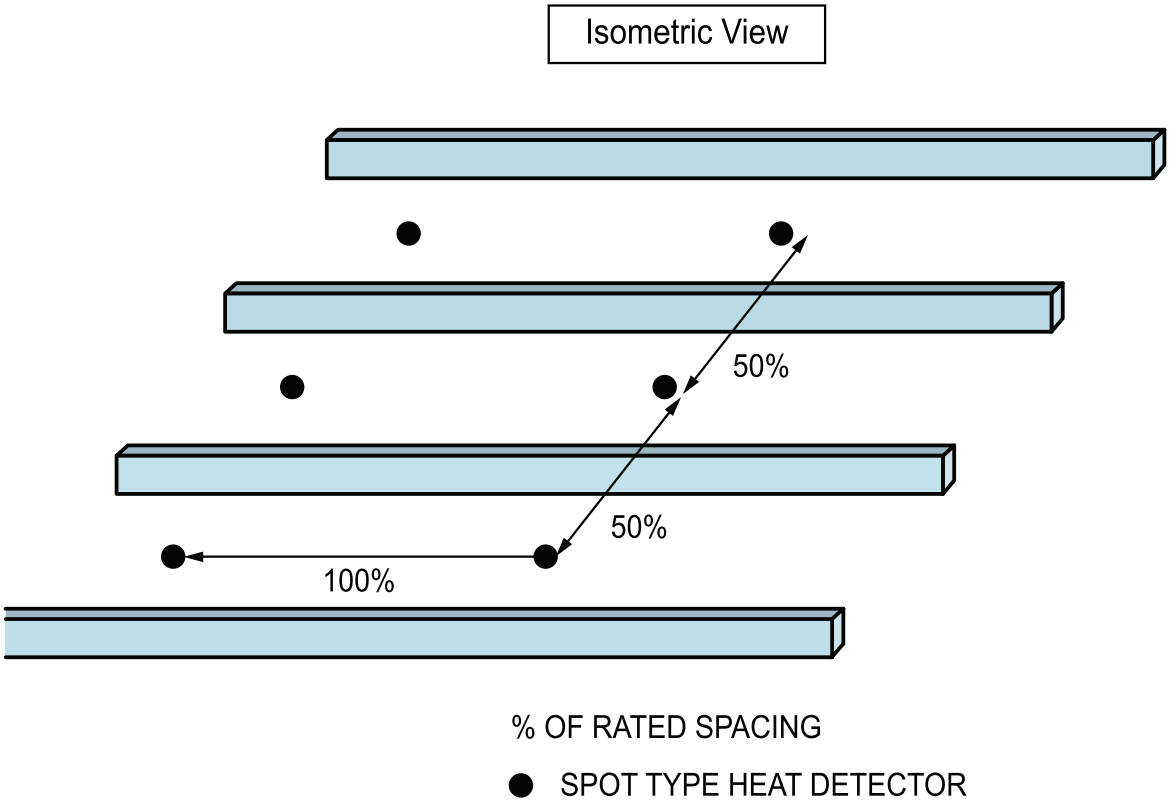


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FIGURE 24
DETECTOR SPACING OF SPOT TYPE SMOKE DETECTORS

(Reference: Clause 8.3.10.9)

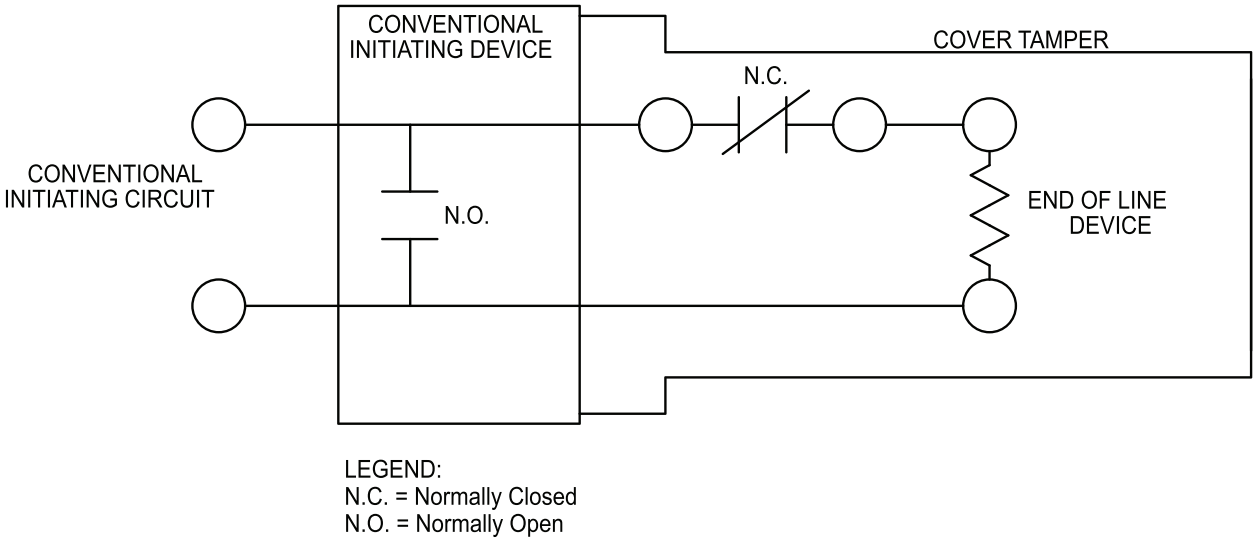




su2266

FIGURE 31.1
EXAMPLE OF TAMPER DEVICE SERVING FIRE SUPPRESSION SYSTEM

(Reference: Clauses 12.3.11 and 12.3.12)



su2267

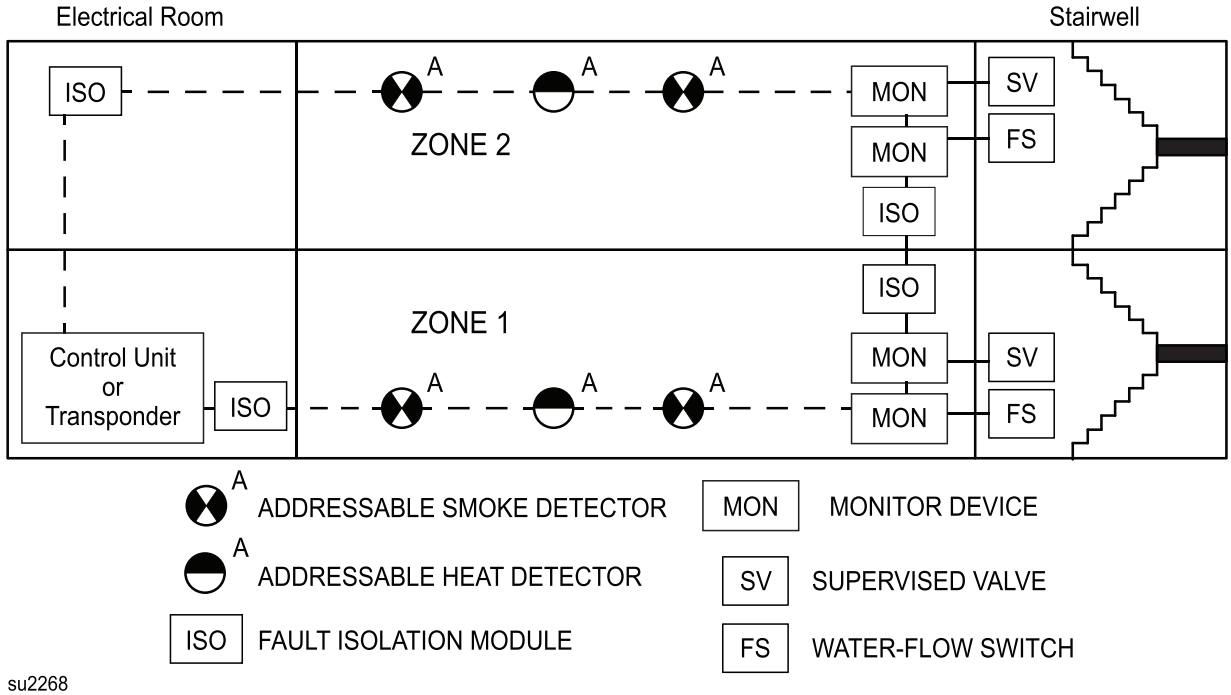
LEGEND:

N.C. = Normally Closed

N.O. = Normally Open

FIGURE 31.2
EXAMPLE OF SUPPORTING FIELD DEVICES SERVING FIRE SUPPRESSION SYSTEM

(Reference: Clause 12.3.13)

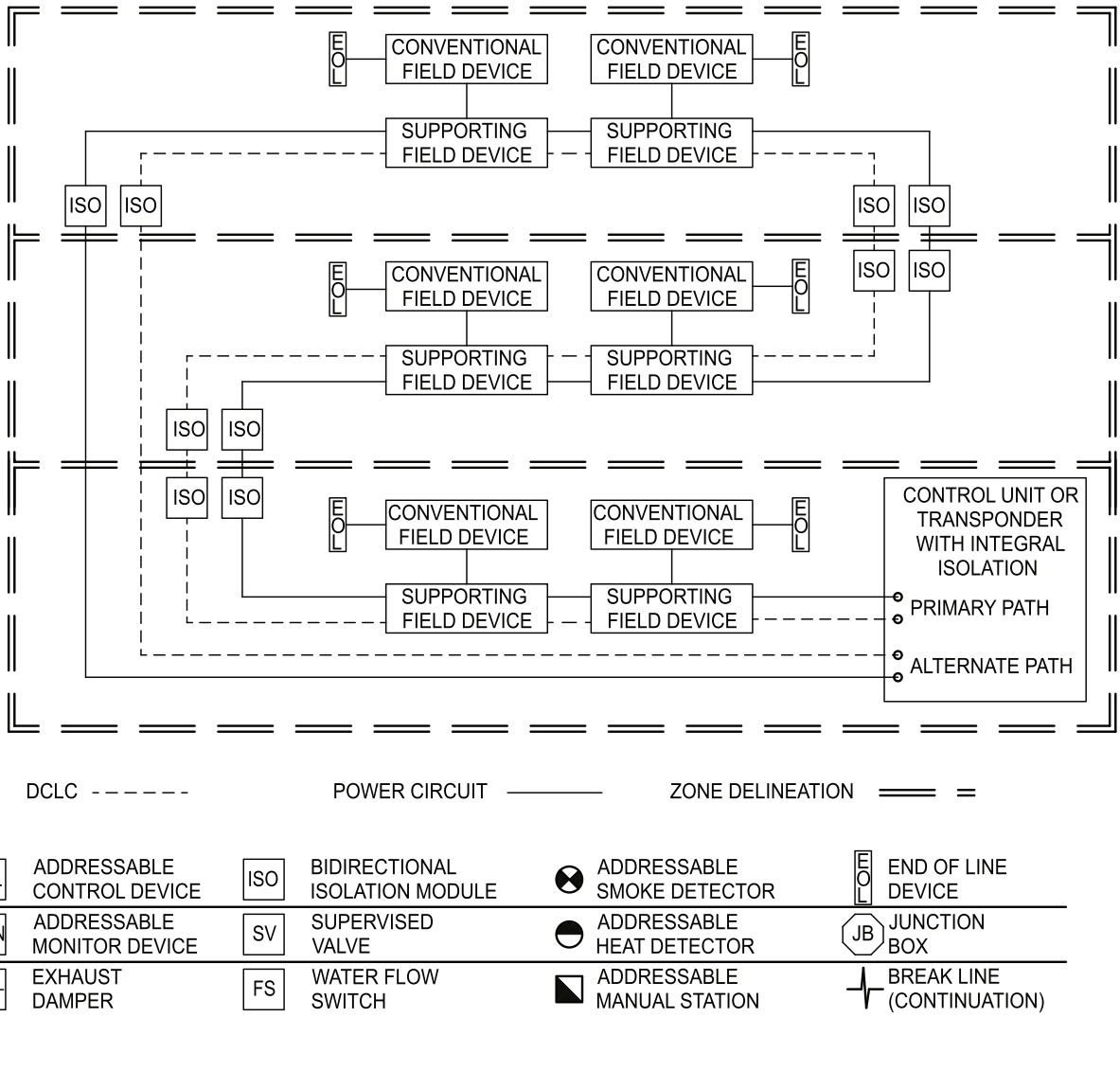


su2268

FIGURE 33.5
INSTALLATION OF POWER BUSS FAULT ISOLATOR SERVING FIELD DEVICES

(Reference: Clause 10.2.4.1)

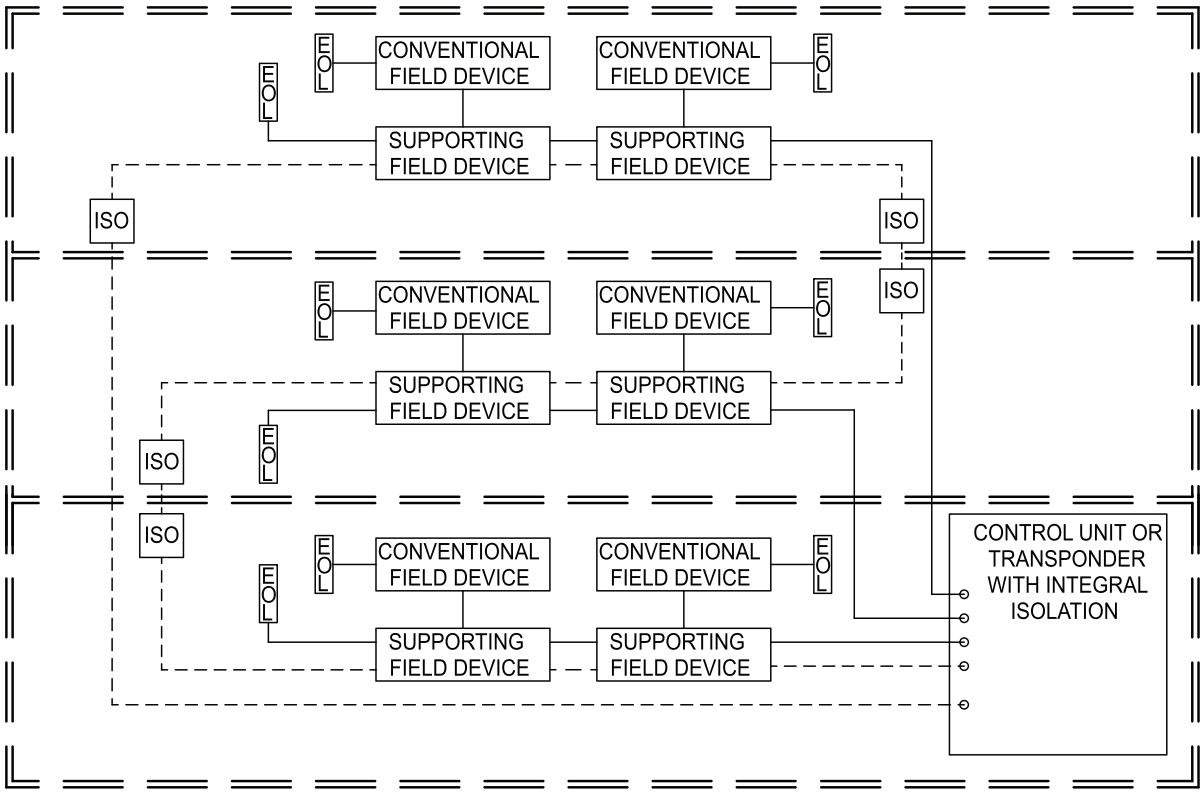
A. POWER BUSS FAULT ISOLATOR ON POWER CIRCUIT



CTL	ADDRESSABLE CONTROL DEVICE	ISO	BIDIRECTIONAL ISOLATION MODULE		ADDRESSABLE SMOKE DETECTOR	EOL	END OF LINE DEVICE
MON	ADDRESSABLE MONITOR DEVICE	SV	SUPERVISED VALVE		ADDRESSABLE HEAT DETECTOR	JB	JUNCTION BOX
	EXHAUST DAMPER	FS	WATER FLOW SWITCH		ADDRESSABLE MANUAL STATION		BREAK LINE (CONTINUATION)

su2269

B. NO ISOLATOR ON POWER CIRCUIT



DCLC - - - - - - POWER CIRCUIT ——— ZONE DELINEATION ═══ ═

CTL	ADDRESSABLE CONTROL DEVICE	ISO	BIDIRECTIONAL ISOLATION MODULE		ADDRESSABLE SMOKE DETECTOR	EOL	END OF LINE DEVICE
MON	ADDRESSABLE MONITOR DEVICE	SV	SUPERVISED VALVE		ADDRESSABLE HEAT DETECTOR	JB	JUNCTION BOX
	EXHAUST DAMPER	FS	WATER FLOW SWITCH		ADDRESSABLE MANUAL STATION		BREAK LINE (CONTINUATION)

su2270

NOTE: Refer to the manufacturer's published installation instruction in regard to separation of riser wiring.

A APPENDIX A (INFORMATIVE) – EXPLANATORY MATERIALS

A4.2.3.3 Uninterruptable Power Supplies (UPS)

Uninterruptable power supplies (UPS) should be installed in accordance with CSA C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Section 46 - Emergency Power Supply, Unit Equipment, Exit Signs, and Life Safety Systems.

A warning condition from the UPS system should provide a non-latching *supervisory signal* on the *fire alarm system* indicating a common UPS system fault condition.

Loss of primary power to the UPS system should provide a non-latching *supervisory signal* on the *fire alarm system* indicating a loss of primary power.

The disconnecting means for a UPS system should be fitted with a locking device to prevent unauthorized operation.

The input and output of a UPS system should be permanently connected except where the UPS system and the connections are provided in a lockable enclosure.

A5.8 LARGE SCALE NETWORK SYSTEMS

A5.8.1 CAMPUS STYLE NETWORK

There are instances where multiple *buildings* or structures, which are protected by individual *fire alarm control units* and *transponders*, are served by a common *fire alarm* network. In these applications, only *control units* and *transponders* connected with DCLC are permitted to provide control functions. Where *control units* and *transponders* are connected by DCLB or DCLA, they are permitted to provide monitoring function only. Refer to Figures 4.1 and 4.2.

In the determination for the application of Large Scale Network requirements, all *active field devices*, *supporting field devices*, and *fire detectors* connected to a *fire alarm system* are required to be counted. This includes where a *fire alarm system* covers multiple *buildings* and / or facilities. For example, a *fire alarm system* serving a main *building* and ancillary *buildings* on the same property would require all devices in all *buildings* to be counted.

For specific consideration are campus style *fire alarm systems*, such as those common in post-secondary institutions or large business facilities. These systems commonly cover multiple *buildings* with a common communication network which interconnect the *building fire alarm systems*. When considering if these campus *fire alarm systems* are to meet the large scale network requirements, the type of common communication network needs to be reviewed.

Where the network is provided only for supervision (i.e., to a campus security office), this network does not create a common *fire alarm system* between the various campus *buildings*. Rather, the network is for monitoring only and allows each *building fire alarm system* to function independently. In this case, the *active field devices*, *supporting field devices*, and *fire detectors* for each individual *fire alarm system* are to be considered independently. Where this common supervision also provides the connection to a fire *signal receiving centre* for the purposes of sending a signal to the local fire department, and directly, or indirectly to a fire *signal receiving centre*, the requirements of CAN/ULC-S561 are also applicable.

Where the network is provided with command and control functions, this type of network creates a common *fire alarm system* throughout the campus. As such, all *active field devices*, *supporting field devices*, and *fire detectors* on the network are required to be counted. With these types of systems, the *design* professionals should consider, in conjunction with the *authorities having jurisdiction*, the appropriateness of this type of system for the campus.

NOTE: For additional information on controls, refer to Clauses 5.2.9 through5.2.11.

In applying the requirements for Large-Scale Networks to campus style *fire alarm systems*, the requirements of Subsection 5.8, Large Scale Network Systems, are to be assessed to determine applicability and appropriateness for the system. For example, the requirement to locate network conductors in fire rated enclosures or to provide fire rated conductors may not be appropriate. In many campus style systems, network conductors are installed in below-grade raceways. In these situations, an equivalent fire protection may be achieved by the installation methodology.

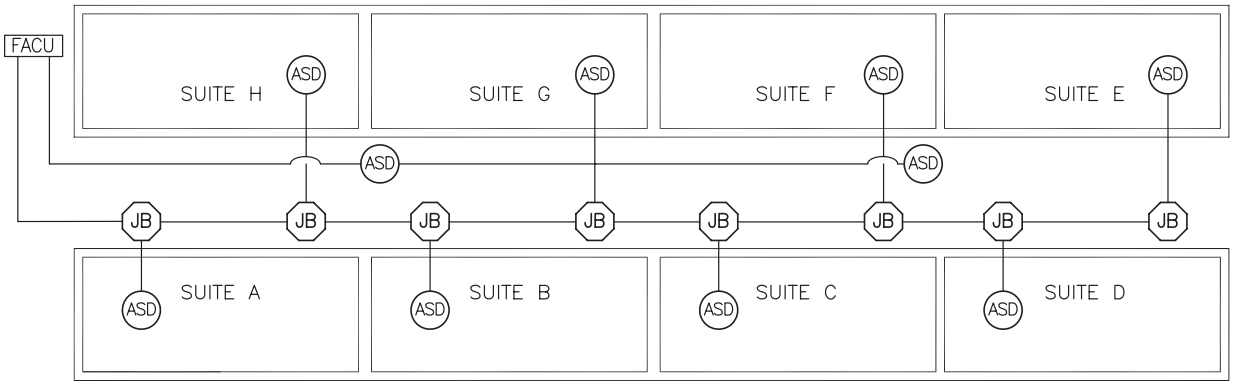
A5.8.8

In order to ensure continuous operation of the *fire alarm* and *voice communication* systems in a “High Building” for a sufficient duration of time to control and direct the evacuation of building occupants, a level of protection is required by the National Building Code of Canada, for those electrical conductors interconnecting the major elements of the *fire alarm system*. These requirements are in addition to the requirements of Subsection 5.8, Large Scale Network Systems.

NOTE: Requirements for “High Buildings” are described in the National Building Code of Canada.

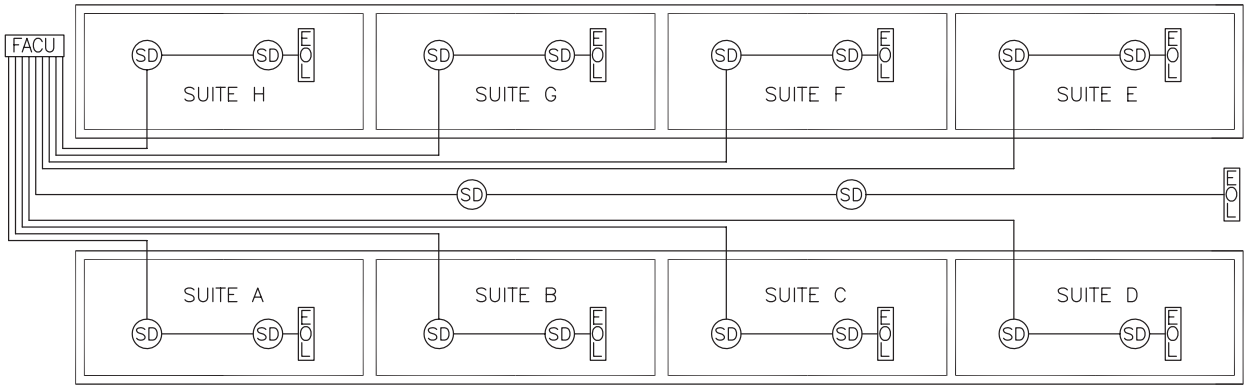
A10.2.6 EXAMPLES OF WIRING CONFIGURATIONS FOR RESIDENTIAL NOTIFICATION DEVICES

A. ADDRESSABLE SIGNAL DEVICES ON DCL WITH LOW VOLTAGE POWER SUPPLY CIRCUIT



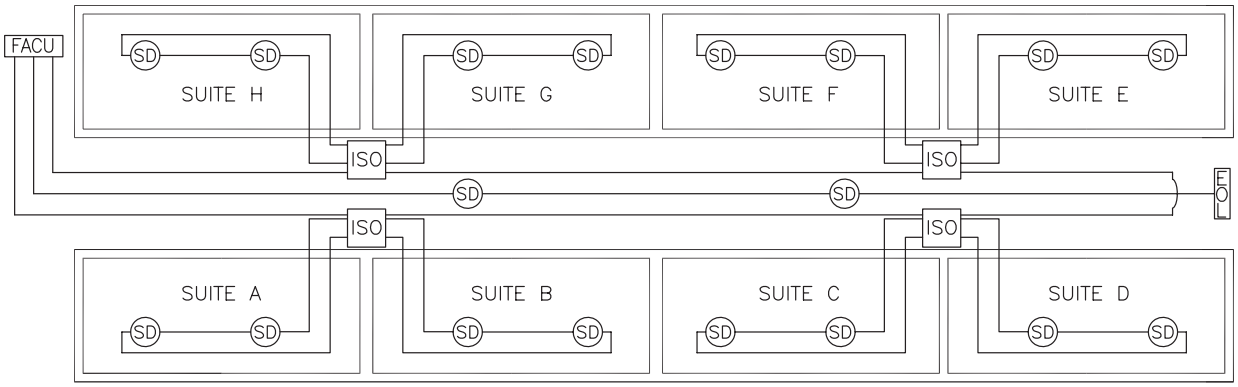
NOTE: This example represents one way of meeting the requirement but there may be other methods that are also acceptable.

B. SIGNAL DEVICES ON SEPARATE CIRCUITS

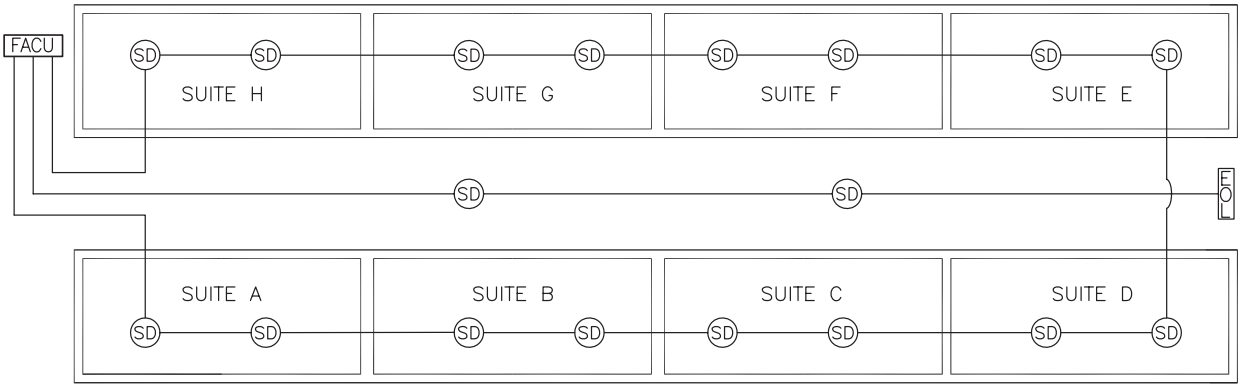


NOTE 1: Circuits wired back to *control unit* or *transponder*.

C. CLASS B CIRCUIT WITH SUITE FAULT ISOLATORS



D. CLASS A CIRCUIT FOR IN-SUITE SIGNALS



A12.2.1

It is common practice to use the cross-zone, counting zone or priority matrix features of the *control unit* or *transponder* for releasing fire suppression systems.

A12.2.2

Air sampling-type detectors can provide multiple thresholds of smoke detection. Some levels may be used for pre-alarm notification, while higher smoke obscuration levels may be used for alarm activation. While suppression system release may be activated by a higher smoke obscuration level, the fire detection threshold for the activation of the *building fire alarm system* must be in accordance with CAN/ ULC-S529, Standard for Smoke Detectors for Fire Alarm Systems.

A12.3.3

The 90 s duration is from the start of the water flow to the activation of the *water flow device*. The response time of the *fire alarm system* after activation of the *water flow device* shall be in accordance with Table 2, Response Times for Control Units and Transponders.

A12.4.4

Where notification devices to warn occupants to evacuate a protected space and not to enter a protected space are provided, each type of notification device shall provide unique notification. For example, in a *building* where the base *building fire alarm system* utilizes horns for occupant notification, the notification devices installed to warn persons within the protected space of the activation of the suppression system could be bells and the notification devices installed to warn persons not to enter the protected space could be *visible signal devices*

F APPENDIX F (INFORMATIVE) – BASE BUILDING ANNUNCIATION FOR HIGH VALUE ASSET FIRE PROTECTION SYSTEMS

(Reference: Subsection 12.3)

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STANDARD FOR INSTALLATION OF FIRE ALARM SYSTEMS

PREFACE

This is the Sixth Edition CAN/ULC-S524-14, Standard for Installation of Fire Alarm Systems.

This Edition of the Standard was developed by the ULC Standards Working Group on S524, reviewed by the ULC Standards Subcommittee on Installation, Inspection and Verification of Fire Alarm Systems, and has been formally approved by the ULC Standards Committee on Fire Alarm and Life Safety Equipment and Systems.

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

Appendices A to F, identified as informative, are for guidance and informational purposes only.

In Canada, there are two official languages, French and English. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require markings and/or instructions to be in either or both official languages, except as stated elsewhere in this Standard.

This Sixth Edition National Standard of Canada is based on, and now supersedes, the Fifth Edition publication.

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

Requests for interpretation of this Standard should be sent to ULC Standards. The requests should be worded in such a manner as to permit a “yes” or “no” answer based on the literal text of the requirement concerned.

The initiation of the review of this Standard will commence within 5 years of the date of publication, unless the Standard is identified as fitting within a stabilized category, whereby the review will commence within the appropriate time frame set out by ULC Standards.

This Standard is intended for conformity assessment.

1 SCOPE

1.1 This Standard describes the requirements for the *design* and installation of a *fire alarm system* with or without *voice communication* capability, as defined in Section 3, Glossary.

NOTE 1: This Standard is intended to apply to both required and voluntary fire alarm installations.

NOTE 2: The requirements in this Standard address the installation for various types of *fire alarm system* equipment and devices. These requirements are intended to apply when the equipment and devices are required by the *fire alarm system design*.

NOTE 3: This Standard recognizes that a *fire alarm system* may have additional features or functions differing from those detailed in these requirements, if the features or functions enhance:

A the life safety of the occupants of the *building*; and/or

B the protection of the *building* or property.

Refer to Appendix A (Informative) Explanatory Materials, Clause A1.1.

1.2 The installation of fire detection and alarm devices not covered by these requirements shall be in accordance with good engineering practice and manufacturer's published installation instructions.

2 REFERENCE PUBLICATIONS

2.1 The documents shown below are referenced in the text of this Standard. Unless otherwise stated elsewhere in this Standard such reference shall be considered to indicate the edition and/or revisions of the document available at the date on which the Committee approved this ULC Standard. All undated references shall be interpreted as referring to the latest edition of that document.

Documents Published by the CSA Group
5060 Spectrum Way, Mississauga, ON L4W 5N6 Canada
Telephone: (416) 747-4000 or 1-800-469-6727
www.csagroup.ca

• CSA C22.1-12, Canadian Electrical Code (CEC), Part I, Safety Standard for Electrical Installations

• CSA C282-09, Emergency Electrical Power Supply for Buildings

• CAN/CSA Z32-09, Electrical Safety and Essential Electrical Systems in Health Care Facilities

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Documents Published by the National Fire Protection Association (NFPA)
1 Batterymarch Park, Quincy, MA 02169-7471 U.S.A.
Telephone: (617) 770-3000
www.nfpa.org

• NFPA 13-2013, Standard for Installation of Sprinkler Systems

• NFPA 72-2013, National Fire Alarm and Signaling Code

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