UL 864

STANDARD FOR SAFETY

Control Units and Accessories for Fire Alarm Systems

UL Standard for Safety for Control Units and Accessories for Fire Alarm Systems, UL 864

Eleventh Edition, Dated October 9, 2023

Summary of Topics

This Eleventh Edition of ANSI/UL 864 dated October 9, 2023 has been issued to incorporate changes from proposals dated February 25, 2022 and August 19, 2022.

The requirements are substantially in accordance with Proposal(s) on this subject dated February 25, 2022 and August 19, 2022.

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NATIONAL STANDARD OF CANADA
STANDARDS COUNCIL OF CANADA
CONSEIL CANADIEN DES NORMES
NORME NATIONALE DU CANADA

Commitment for Amendments

This Standard is issued jointly by ULSE Inc. (ULSE) and ULC Standards. Amendments to this Standard will be made only after processing according to the Standards writing procedures by ULSE and ULC Standards.

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Comments or proposals for revisions on any part of the Standard may be submitted at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

This ANSI/UL Standard for Safety consists of the Eleventh Edition. The most recent designation of ANSI/UL 864 as an American National Standard (ANSI) occurred on October 9, 2023. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface.

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CONSTRUCTION

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Preface

This is the common ULSE and ULC Standard for Control Units and Accessories for Fire Alarm Systems. It is the fifth edition of CAN/ULC 527 and the Eleventh edition of UL 864.

This common Standard was prepared by UL Standards & Engagement Inc. (ULSE), ULC Standards, and the Joint UL/ULC Task Group. The efforts and support of the Joint Task Group are gratefully acknowledged.

This Standard was formally approved by the ULC Standards Committee on Fire Alarm and Life Safety Equipment and Systems and UL Standard Technical Panel on Fire Protection Signaling Equipment.

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.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

Annexes A, B and Care identified as informative and are for informational purposes only.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

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INTRODUCTION

1 Scope

1.1 This Standard covers requirements as related to the following:

a) Discrete electrical control units and accessories for fire alarm systems including smoke control, releasing, Building System Information Unit (BSIU), and emergency communication systems;

b) Electrically- and electronically-operated amplifiers that provide speech communication and distinctive sounds in conjunction with fire protective signaling systems; and

c) Commercial stationary and fixed power supplies for fire-protective signaling systems, having input and output ratings of not more than 600 V, direct- and alternating-current, (DC and AC).

1.2 This Standard covers requirements for control units, fire alarm systems and control unit accessories to be employed in ordinary (nonhazardous) indoor and outdoor locations in accordance with the following standards as applicable:

a) CSA C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations

b) NBC, National Building Code of Canada

c) NFPA 12, Standard for Carbon Dioxide Extinguishing Systems

d) NFPA 12A, Standard for Halon 1301 Fire Extinguishing Systems

e) NFPA 13, Standard for the Installation of Sprinkler Systems

f) NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection

g) NFPA 16, Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems

h) NFPA 17, Standard for Dry Chemical Extinguishing Systems

i) NFPA 17A, Standard for Wet Chemical Extinguishing Systems

j) NFPA 70, National Electrical Code

k) NFPA 72, National Fire Alarm and Signaling Code

l) NFPA 92, Standard for Smoke, Control Systems

m) NFPA 750, Standard for Water Mist Fire Protection Systems

n) NFPA 2001, Standard for Clean Agent Fire Extinguishing Systems

o) NFPA 2010, Standard for Aerosol Fire Extinguishing Systems

p) ULC-S524, Standard for the Installation of Fire Alarm Systems.

1.3 The products covered by this standard are intended to be used in combination with other appliances and devices to form a commercial fire alarm system. These products provide all monitoring, control, and indicating functions of the system. An installation document(s) provided with the product describes the various products needed to form a fire alarm system and their intended use and installation.

1.4 This Standard does not cover replacement parts for fire alarm systems that consist of products or subassemblies of complete products manufactured in accordance with previous editions of their respective standards.

1.5 This standard does not cover:

a) Manual boxes, automatic fire detectors, manual releasing stations, other initiating devices (e.g. carbon monoxide, and other similar gas sensors) notification appliances not provided as part of the product; and

b) In the United States only: Abort stations.

1.6 This Standard does not cover devices such as fans, dampers, motors, etc., which perform smoke control functions.

1.7 The term “product” as used in this Standard refers to all items of equipment covered by the Scope.

1.8 These requirements do not include determination of compliance with:

a) In Canada only: The rules and regulations of Innovation, Science and Economic Development Canada.

b) In the United States only: The rules and regulations of the Federal Communications Commission (FCC).

2 Components

2.1 A component of a product covered by this standard shall comply with the requirements for that component. Refer to Annex C for a list of standards covering components used in the products covered by this Standard.

Exception: A component shall not be required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard; or

b) Is superseded by a requirement in this standard.

2.2 A component shall be used in accordance with its rating established for the intended conditions of use.

2.3 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Reference Publications

4.1 Where reference is made to other publications, such reference shall be considered to refer to the latest edition and all amendments published to that edition up to the time when this Standard was approved.

4.2 The following publications are referenced in this Standard:

ASA S3.41, *Audible Emergency Evacuation (E2) and Evacuation Signals with Relocation Instructions (ESRI)*

ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*

ASTM D396, *Standard Specification for Fuel Oils*

ASTM E11, *Standard Specification for Woven Wire Test Sieve Cloth for Test Sieves*

ASTM E230/E230M, *Standard Specification for Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples*

Code of Federal Regulations (CFR) 47, Part 15

CSA C22.1, *Canadian Electrical Code, Part I, Safety Standard for Electrical Installations*

CSA C22.2 No. 0.1, *General Requirements for Double Insulated Equipment*

CSA C22.2 No. 0.15, *Adhesive Labels*

CSA-C22.2 No. 0.17, *Evaluation of Properties of Polymeric Materials*

CSA C22.2 No. 0.4, *Bonding of Electrical Equipment*

CSA 6.19, *Residential Carbon Monoxide Alarming Devices*

CSA C22.2 No. 65, *Standard for Wire Connectors*

CSA C22.2 No. 66.1, *Low Voltage Transformers – Part 1: General Requirements*

CSA C22.2 No. 66.2, *Low Voltage Transformers – Part 2: General Purpose Transformers*

CSA C22.2 No. 66.3, *Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

CSA-C22.2 No. 94, *Special Purpose Enclosures Industrial Products*

CSA C22.2 No. 153, *Electrical Quick-Connect Terminals*

CSA C22.2 No. 158, *Terminal Blocks*

CSA 60065, *Audio, Video, and Similar Electronic Apparatus – Safety Requirements*

CSA-E60384-1, *Fixed Capacitors for Use in Electronic Equipment – Part 1: Generic Specification*

CSA C22.2 No. 60950-1A and 1B, *Information Technology Equipment – Safety – Part 1: General Requirements, with Amendments 1 and 2*

CSA-C22.2 No. 62368-1, *Audio/Video, Information and Communication Technology equipment – Part 1: Safety requirements*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3 : Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-20, *Electromagnetic compatibility (EMC) – Part 4-22: Testing and measurement techniques – Radiated emissions and immunity measurements in fully anechoic rooms (FARs)*

IEEE Y32.9, *Graphic Symbols for Electrical Wiring and Layout Diagrams Used in Architecture and Buildings Construction*

ISO 9001, *Quality Management Systems-Requirements*

MIL-HDBK-338, *Military Handbook: Electronic Reliability Design Handbook*

MIL-STD-750F, *Department of Defense Test Method Standard: Test Methods for Semiconductor Devices*

MIL-STD 883H, *Test Method Standard for Microcircuits*

NBC, *National Building Code of Canada*

NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems*

NFPA 70, *National Electrical Code*

NFPA 72, *National Fire Alarm and Signaling Code*

NFPA 90A, *Standard for Installation of Air-Conditioning and Ventilating Systems*

NFPA 2001, *Standard for Clean Agent Fire Extinguishing Systems*

NFPA 2010, *Standard for Fixed Aerosol Fire Extinguishing Systems*

RSS-Gen, *Innovation, Science, and Economic Development Canada Radio Standards Specification*

Title 46, *Shipping, Chapter I-Coast Guard, Dept. of Transportation*

UL 38, *Manual Signaling Boxes for Fire Alarm Systems*

UL 50, *Enclosures for Electrical Equipment, Non-Environmental Considerations*

UL 268, *Smoke Detectors for Fire Alarm Systems*

UL 268A, *Smoke Detectors for Duct Application*

UL 310, *Electrical Quick-Connect Terminals*

UL 464, *Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories*

UL 486A-486B, *Wire Connectors*

UL 486E, *Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors*

UL 497A, *Secondary Protectors for Communications Circuits*

UL 497B, *Protectors for Data Communication and Fire Alarm Circuits*

UL 521, *Heat Detectors for Fire Protective Signaling Systems*

UL 746C, *Polymeric Materials – Use in Electrical Equipment Evaluations*

UL 1012, *Power Units Other Than Class 2*

UL 1059, *Terminal Blocks*

UL 1097, *Double Insulation Systems for Use in Electrical Equipment*

UL 1449, *Surge Protective Devices*

UL 1480, *Speakers for Fire Alarm and Signaling Systems, Including Accessories*

UL 1638, *Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories*

UL 1971, *Signaling Devices for the Hearing Impaired*

UL 2034, *Single and Multiple Station Carbon Monoxide Alarms*

UL 2043, *Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces*

UL 2075, *Gas and Vapor Detectors and Sensors*

UL 60950-1, *Information Technology Equipment – Safety – Part 1: General Requirements*

UL 62368-1, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*

ULC-S102, *Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies*

ULC-S524, *Installation of Fire Alarm Systems*

ULC 525, *Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories*

ULC 526, *Visible Signaling Devices for Fire Alarm Systems, Including Accessories*

ULC S528, *Manual Stations for Fire Alarm Systems, Including Accessories*

ULC 529, *Smoke Detectors for Fire Alarm Systems*

ULC 530, *Heat Actuated Fire Detectors for Fire Alarm Systems*

ULC 536, *Inspection and Testing of Fire Alarm Systems*

ULC 538, *Single and Multi-Criteria Carbon Monoxide Alarms for Non-Residential Applications*

ULC 541, *Speakers for Fire Alarm and Signaling Systems, Including Accessories*

ULC 559, *Equipment for Fire Signal Receiving Centres and Systems*

ULC 588, *Gas and Vapor Detectors and Sensors*

5 Glossary

5.1 For the purpose of this standard, the following definitions apply:

5.2 ACCESS CODE – A unique alpha/numeric or similar set of characters that, when entered into a software-controlled control unit, grants access to one or more levels of system operation.

5.3 ACKNOWLEDGE – Action taken to confirm that a message or signal has been received, such as pressing a button.

5.4 ACTIVE MULTIPLEX SYSTEM – A system employing a communication method characterized by simultaneous or sequential transmission, or both, and reception of multiple signals, including a means for positively identifying each signal. Employs devices such as transponders and transceivers to transmit status signals of each initiating device within a prescribed time interval so that lack of receipt of such signal is to be interpreted as a trouble signal.

5.5 ADVERSE CONDITION – Any condition occurring in a circuit or communication path that interferes with the proper signaling or interpretation of status-change signals or both. Conditions include radio frequency interference.

5.6 AIR-HANDLING SPACE – Space used for environmental air-handling purposes other than ducts or plenums. The space over a hung ceiling used for environmental air-handling is an example.

5.7 ALARM CONDITION – The state of the control unit wherein an alarm response is generated and all required signaling and activations occur.

5.8 ALARM VERIFICATION (STATUS CHANGE CONFIRMATION) – A feature of automatic fire-detection and alarm systems to reduce unwanted alarms wherein smoke detectors report alarm conditions for a minimum period of time, or confirm alarm conditions for a given period of time after reset, in order to be accepted as a valid alarm initiation.

5.9 ANNUNCIATOR – A system component containing one or more indicator lamps, alphanumeric displays, or other equivalent means in which each indication provides status information about a circuit, condition, or location.

In Canada only: As specified in the National Building Code of Canada.

5.10 AUTHORITY HAVING JURISDICTION (AHJ) – The government body responsible for the enforcement of any part of this Standard or the official or agency designated by that body to exercise such a function.

5.11 BUILDING – Any structure used or intended for supporting or sheltering any use or occupancy.

5.12 CHANNEL – A path for voice, data, or signal transmission. This may utilize the modulation of light, radio frequency, current, or voltage within a frequency band or other technologies.

5.13 CIRCUIT CLASSIFICATIONS:

a) Hazardous Voltage Circuit – A circuit involving a potential of not more than 300 volts nominal and having characteristics in excess of those of a non-hazardous voltage circuit.

b) Non-hazardous voltage Circuit – A circuit involving a potential of not more than 30 volts alternating current (AC) rms, 42.4 volts direct current (DC) or peak.

c) Power-Limited Circuit – A circuit wherein the power is limited as specified in Table 73.1 and Table 73.2.

5.14 CIRCUIT TYPES:

a) Ancillary Circuit – A circuit which connects a control unit and/or transponder to ancillary devices, located within the protected premises.

b) Communications Circuit – A circuit or path connecting subsidiary/satellite station(s) to supervising station(s) over which signals are carried.

c) External Circuits – Circuits or wiring leaving the product.

d) Initiating Device Circuit – Circuit to which automatic or manual initiating devices are connected where the signal received does not identify the individual device operated.

e) Input Circuit – A circuit connected directly to conventional field devices and employed to provide a control unit and/or transponder with field device status information.

f) Notification Appliance Circuit – A circuit or path directly connected to a notification appliance.

g) Output Circuit – A circuit connected directly to field devices and employed to provide an alert signal, alarm signal or other output functions.

NOTE: The following are considered typical examples of control unit outputs and may utilize conventional field devices, active field devices, or supporting field devices (For data communications link operations):

1) Signaling circuits – visual and/or audible tone and voice circuits used to notify occupants;

2) Releasing device circuits energized by the control unit;

3) Remote visual display circuits;

4) Smoke control circuits;

5) Non-extinguishing and non-water based releasing circuits;

6) Other ancillary circuits powered by the fire alarm system; and

7) Power circuits.

h) Polarity Reversal Circuit – Direct-current circuit employed where an alarm condition results in a polarity reversal on a communications or transmission line.

i) Signaling Line Circuit (SLC) – A circuit or path between any combination of circuit interfaces, control units, or transmitters over which multiple-system input signals or output signals, or both, are carried.

j) Supplementary-Device Circuit – A circuit provided by a product for controlling a device, the operation of which is supplementary to the primary initiating and indicating devices of the control unit.

In Canada only:

NOTE: A supplementary-device circuit is referred to as an ancillary circuit which connects a control unit and/or transponder to ancillary devices, located within the protected premises.

5.15 COMBINATION SYSTEM – A system within the scope of this standard whose components might be used, in whole or in part, with other systems.

5.16 COMPATIBLE – The correct electrical, electronic, or mechanical interaction between a series of system components that depend on individual unique characteristics and are connected together to meet the requirements of this Standard (e.g., control unit and/or transponder and field devices).

5.17 CONTROL UNIT – A component which provides the control and logic processing for a fire alarm system.

5.18 CONTROL UNIT ACCESSORY – A device or appliance externally connected to a control unit that is employed to assure proper operation of a system or to provide supplementary signaling and/or annunciation. Examples of control unit accessories are annunciators, end-of-line resistors or diodes, auxiliary relays, remote switches, fault isolators and the like.

5.19 CONTROL UNIT, PROTECTED PREMISES – A unit that directly or indirectly monitors the status of initiating devices, processes any status-change signals, and performs logical control to generate output signals required by the system type.

5.20 CONTROL UNIT, SUPERVISING STATION – A unit that directly or indirectly receives status-change signals from one or more protected-premises control units and performs processing and logical control to generate output signals required by the system type.

5.21 CONTROL UNIT SYSTEM TYPES –

a) Auxiliary – A system that uses the municipal fire alarm system for transmitting an alarm of fire to the public fire service communications center. Fire-alarm signals transmitted from the premises are received at the public fire service communications center on the same equipment and by the same method as alarms transmitted manually from the fire alarm boxes located on the street.

b) Central Station – A system in which status-change signals at a protected premises are automatically transmitted to a central supervising station where competent and experienced personnel take appropriate action in response to a received signal. The central supervising station is controlled and operated by a person, firm, or corporation whose business includes the furnishing, maintaining, or monitoring of supervised fire alarm systems.

c) Local – A system located at the protected premises which indicates alarm, trouble and supervisory conditions via notification appliances within the protected premises.

d) Marine – A local protected premises system that is intended to be installed aboard a commercial vessel.

e) Proprietary – Local control unit installed at the protected premises with provision for connection via a transmission channel to a Proprietary Receiving Unit. A system in which status change signals occurring at the protected premises are automatically transmitted to an on-premise supervising station where trained, competent personnel take appropriate action in response to a received signal. The protected property may be contiguous or non-contiguous but must be under one ownership.

f) Releasing – A local protected premises system that also initiates release of an extinguishing agent upon the detection of an alarm condition.

g) Remote Station – A system in which status change signals occurring at a protected premises are transmitted to a supervising station at a public fire services communications center, a fire station, or a similar governmental agency that has a public responsibility for taking prescribed action to ensure response upon receipt of a fire alarm signal. Trouble and supervisory signals may be transmitted to a supervising station at a different location.

h) Smoke Control – A system which, during an alarm condition, provides selective and overriding control of mechanical fans, dampers, and the like to produce airflow and pressure differences across smoke barriers to limit and direct smoke movement. A system is categorized as either or both of the following types:

1) Dedicated – A system which is normally inactive and is used exclusively for the purpose of smoke control.

2) Nondedicated – A system which provides the building heating-ventilating-air conditioning (HVAC) function under normal conditions and provides a smoke control objective during a fire alarm condition.

5.22 DATA COMMUNICATION LINK (DCL) – The data channel between control units and/or transponders, annunciators, active field devices and supporting field devices of a distributed type system or a remote receiving equipment control unit.

5.23 DEGRADED MODE CAPABILITY – A feature where, under conditions of partial data communication link failure, control units and/or transponders which remain connected to each other, are capable of receiving inputs and activating outputs in the areas served by the control units and/or transponders which remain in communication with each other.

5.24 DERIVED CHANNEL – A circuit that uses the local leg of the public switched network as an active multiplex channel while simultaneously allowing that leg's use for normal telephone communications.

5.25 DEVICE TYPES:

a) Active Field Device – A field device that can be uniquely identified by a control unit and/or transponder to determine its presence and operating status, and which may be commanded to operate or to change its operating parameters independently of other field devices that share a common circuit.

b) Addressable Device – A fire alarm system component with discrete identification that can have its status individually identified or that is used to individually control other functions.

c) Analog Initiating Device (Sensor) – An initiating device that transmits a signal indicating varying degrees of conditions as contrasted with a conventional device, which can only indicate an alarm/no alarm condition.

d) Ancillary Device – A device which has a life-safety application, and is connected to the fire alarm system, but is not part of the fire alarm system.

e) Conventional Field Device – A field device that is usually connected to a control unit and/or transponder on a common wiring circuit with other devices so that all devices on the circuit provide a common status change information (e.g. fire alarm detection or signaling). Such devices cannot be uniquely identified by a control unit and/or transponder unless there is only one device on the circuit. (Refer to active field device).

f) Emergency Control Function Interface Device – A fire alarm or signaling system component that directly interfaces with the system that operates the emergency control function.

g) End-Of-Line Device – A device installed at the end of a circuit for the purpose of monitoring the circuit for fault conditions.

h) Field Device – A device located remotely from, but connected electrically to, a control unit and/or transponder to transmit or receive status change information (e.g. fire alarm detection or signaling).

i) Initiating Device – A manually or automatically operated device, the normal intended operation of which results in signal indication from the product/system. Examples of alarm-initiating devices are thermostats, manual boxes, smoke detectors, water-flow switches, and proof sensors. Examples of supervisory signal-initiating devices are water-level indicators, sprinkler-system valve-position signals, pressure supervisory transmitters, and water-temperature switches.

j) Long-Range Radio-Frequency Devices – Any device that communicates between a protected premises and a subsidiary station, supervising station, or another protected premises using a private radio network.

k) Manual Abort Device – A self-restoring control unit accessory that allows manual initiation of the abort feature of the fire alarm control unit.

l) Manual Release Device – A device that allows manual initiation of the manual release feature.

m) Prerecorded Message Device – An automatically- or manually-actuated device intended to translate a pre-recorded message stored on a tape or other medium into an electronic signal that when amplified and introduced into speakers produces vocal or tonal information.

n) Short-Range Radio Frequency Device – Any device that communicates with control/receiving equipment at the protected premises by low-power radio signals in accordance with:

1) In Canada only: RSS-Gen

2) In the United States only: CFR 47, Part 15

NOTE: Short-range radio frequency device links are commonly referred to as wireless device links and may be subject to the requirements of Innovation, Science, and Economic Development Canada Radio Standards Specification.

o) Signaling Device – A component that provides audible, tactile, or visible outputs or any combination thereof.

p) Supplementary Device – A device that has not been investigated to this Standard intended to be connected to a supplementary device circuit.

q) Supporting Field Device – An active field device that monitors and/or controls other field devices on a separate circuit and reports the status of the separate circuit to the control unit.

5.26 DIGITAL ALARM COMMUNICATOR RECEIVER (DACR) – A system component that accepts and displays signals from digital alarm communicator transmitters (DACTs) sent over the public switched telephone network.

5.27 DIGITAL ALARM COMMUNICATOR SYSTEM (DACS) – A system in which signals are transmitted from a digital alarm communicator transmitter (DACT), located remote from the supervising station, through the public-switched telephone network to a digital alarm communicator receiver (DACR).

5.28 DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT) – A system component to which initiating devices or groups of devices are connected. The DACT seizes the connected telephone line, dials a pre-selected number to connect to a DACR, and transmits signals indicating a status change.

5.29 DIGITAL ALARM RADIO RECEIVER (DARR) – A system component that receives and decodes radio signals.

5.30 DIGITAL ALARM RADIO SYSTEM (DARS) – A system in which signals are transmitted from a digital alarm radio transmitter (DART) located remote from the supervising station through a radio channel to a digital alarm radio receiver (DARR).

5.31 DIGITAL ALARM RADIO TRANSMITTER (DART) – A system component to which initiating devices or a group of devices are connected.

5.32 DIGITIZED VOICE – A pre-recorded, digitally stored voice message that may be activated in the event of an emergency or other conditions.

5.33 DISPLAY – The visual representation of output data or status information, other than printed copy.

5.34 In Canada only:

DISPLAY AND CONTROL CENTRE (DCC) – Equipment used for the status display of required input zones (as specified in the sections: Annunciator and Zone Indication, and Central Alarm and Control Facility, of the National Building Code of Canada) and for the manual control of a fire alarm system, which may include manual control for emergency voice alarm and emergency telephone functions. The display and control centre may be located remotely from a fire alarm control unit and/or transponder.

5.35 DISTRIBUTED TYPE SYSTEM – A system consisting of two or more control units and/or transponders, one of which operates as the display and control center.

5.36 DRIFT COMPENSATION – A feature of a smoke detector or control unit that monitors and automatically maintains alarm sensitivity.

5.37 EMERGENCY CONTROL FUNCTION – Building, fire, and emergency control functions that are intended to increase the level of life safety for occupants in order to control the spread of the harmful effects of fire or other dangerous products.

5.38 EMERGENCY TELEPHONE – A feature of a fire alarm system, which provides two-way voice communication between each floor area and a display and control center and/or the equipment at a central alarm and control facility.

5.39 EMERGENCY VOICE/ALARM COMMUNICATIONS – Dedicated manual or automatic facilities for originating and distributing voice instructions, as well as evacuation signals pertaining to a fire emergency, to the occupants of a building.

5.40 ENDPOINT (DCLN) – The end of the pathway where a single addressable field device is connected.

5.41 EVACUATE POWER – Rated output power for a square wave used for evacuation purposes.

5.42 EVACUATION – The withdrawal of occupants from a building.

5.43 EVENT – Status change that requires visual indication or visual and audible indication as applicable.

5.44 FAULT – An open, ground, or short-circuit condition on any line extending from a product.

5.45 FAULT ISOLATOR – A device or feature used to limit the consequences of a wire to wire short or the consequences of low-parallel-resistance faults between lines of a transmission path.

NOTE: A fault isolator may be a physically separate field device or it may be incorporated into another device apart from the control unit such as a smoke detector or a smoke detector base.

5.46 FIELD WIRING – Conductors to be installed by others to connect a product to source(s) of supply, devices, other products, and loads.

5.47 FIRE ALARM SYSTEM – A combination of interconnected devices consisting of at least a control unit, a manual station and an audible signal device, designed to warn the building occupants of an emergency fire condition.

5.48 FIRE COMMAND CENTER – The principal attended or unattended location where the status of the detection, alarm communications, and control systems is displayed and from which the system can be manually controlled.

5.49 FIREFIGHTER'S SMOKE CONTROL STATION (FSCS) – A product that includes monitoring and overriding control capability over smoke control systems and equipment for the use of the fire department.

5.50 FIRE SIGNAL RECEIVING CENTER – A unit or centre that directly or indirectly receives status change signals from one or more protected-premises signal transmitting units and performs processing and logical control to generate output signals required by the system type while monitored at all times by trained personnel designated by the owners of the protected properties.

5.51 FIXED EQUIPMENT – Any equipment product that is intended to be permanently connected electrically to the wiring system.

5.52 GAUGES – Wherever they appear in this standard, the abbreviations MSG, GSG, and AWG mean, respectively, Manufacturers' Standard Gauge for Steel Sheets, Galvanized Sheet Gauge, and American Wire Gauge. Reference to sheet metal by gauge number is intended only as auxiliary information. Sheet metal of the indicated gauge number may not be used if the forming processes have reduced the thickness of the sheet to a point below the specified minimum thickness.

5.53 GATEWAY – A device that is used in the transmission of digital or analog data from the fire alarm control unit to other building-systems control units, equipment, or networks, and/or from other building-system control units to the fire alarm system.

5.54 GENERAL ALARM – An alarm signal transmitted throughout the protected premises.

5.55 GROUNDED CONDUCTOR – A conductor employed to connect the intentionally grounded circuit of a wiring system to a grounding electrode.

5.56 GROUND FAULT – A circuit impedance to ground sufficient to result in the annunciation of a trouble condition.

5.57 GROUNDING CONDUCTOR – A conductor employed to connect non-current-carrying parts of equipment, raceways, and enclosure to a grounding electrode at the service which is, in turn, connected to earth ground or to some conducting body which serves in place of earth ground.

5.58 HEAT DETECTOR – A fire detector designed to operate at a predetermined temperature or rate of temperature rise.

5.59 INPUT ZONE – An area or field device within a building which initiates annunciator indication as required by government laws, codes or standards, or other parts of this Standard.

5.60 INSTALLATION LOCATIONS:

a) Damp – A location protected from sun, rain, and water, but may be subject to moisture. Such locations may include basements, barns, cold-storage warehouses, greenhouses, indoor swimming facilities, and the like. They may also include partially protected locations under canopies, marquees, roofed open porches, and the like.

b) Dry – A location with a controlled ambient that is not subject to dampness or wetness.

c) Wet – A location subject to rain (or the spray of noncorrosive and nonflammable liquids) that may become saturated with water or that is unprotected from the weather.

5.61 INTERCOM – Two-way voice-communication equipment intended for fire-emergency use.

5.62 KEYPAD – A means of manually controlling the product. Provided with a visual-indicating device containing identified targets or indicator lamps, alphanumeric displays, or other equivalent means, in which each indication provides status information about a circuit, condition, and/or location.

5.63 LEG FACILITY – That part of the communication channel that connects each protected building or premises to the trunk facility.

5.64 In the United States only:

LIFE SAFETY NETWORK – A type of combination system that transmits emergency communication system and fire data to another life safety system.

5.65 LOCAL AREA NETWORK (LAN) – A local area high speed communication network that spans a single or group of buildings that does not form part of the public communications network.

5.66 MANUAL STATION – A field device designed to initiate a signal when operated manually.

5.67 MESSAGE(S) – Communicated data that contains specific information relating to the status of the product and is transmitted via a wired or wireless pathway from an origin to a destination.

5.68 MONITORING FOR INTEGRITY – A means whereby a fault condition which could interfere with the operation of a circuit in a fire alarm system is detected.

NOTE: Monitoring for integrity may be referred to as electrical supervision in other Codes and Standards.

5.69 MULTIPLEX – A signaling method using wire path, cable carrier, radio, or combinations of these facilities characterized by the simultaneous and/or sequential transmission and reception of multiple signals in a communication channel including means for positively identifying each such signal.

5.70 MULTI-CHANNEL SELECT ZONE SYSTEM – An emergency voice communication system capable of providing more than three separate audio signals simultaneously to selected zones.

5.71 NONVOLATILE MEMORY – A storage device not alterable by the interruption of the power to the memory; for example, ROM, FLASH, PROM, EPROM, and EEPROM.

5.72 NOTIFICATION APPLIANCE – A component that provides audible, tactile, or visual outputs or any combination thereof.

5.73 OFF-HOOK – To make connection with the public-switched telephone network in preparing to dial a telephone number.

5.74 ON-HOOK – To disconnect from the public switched telephone network.

5.75 OPEN FAULT – A circuit impedance increase sufficient to prevent normal operation.

5.76 OPERATOR – Individual(s) responsible to access and operate the product and/or system.

5.77 OPERATOR INTERFACE – Providing one or more displays and/or means of controls for manually operating the product/system. This interface may be, but is not limited to, a Graphical User Interface (GUI) such as a computer screen, a Liquid Crystal Display (LCD), a Human-Machine Interface (HMI), or other audible/visible/tactile indicators.

5.78 PATH (PATHWAY) – Any conductor, optic fiber, radio carrier, or other means for transmitting information between two or more units and/or locations.

5.79 PORTABLE EQUIPMENT – A product that is easily carried or conveyed by hand. When intended to be connected to a hazardous voltage circuit, the product is provided with a power supply cord for connection to the supply circuit.

5.80 POSITIVE ALARM SEQUENCE – An automatic sequence that results in an alarm signal, even when manually delayed for investigation, unless the system is reset.

5.81 POWER SUPPLY – A source of electrical operating power including the circuits and terminations connecting it to the dependent product/system components.

5.82 POWER SUPPLY-BATTERY CHARGER – A power supply that serves the dual function of providing operating power and charging storage batteries. The power supply is usually permanently connected to storage batteries, and the power supply-battery combination is intended to provide all of the electrical operating power required by the equipment to which the combination is connected, when the equipment is operating in its intended manner.

5.83 PRE-ANNOUNCE TONE – An attention-getting signal to alert occupants of the pending transmission of a voice message.

5.84 PRE-SIGNAL ALARM – An arrangement where the operation of an automatic detector or initial operation of a manual station actuates only a selected indicating-device or devices for the purpose of notifying key personnel who then have the option of initiating a GENERAL ALARM.

5.85 PRIMARY BATTERY (NON-RECHARGEABLE BATTERY) – Any battery which by design or construction is not intended to be recharged.

5.86 PRIVATE-RADIO FREQUENCY SYSTEM – A radio system under the control of the supervising station or other company where only private access to the system is permitted.

5.87 PROPERTY:

a) Contiguous Property – A single owner or single user protected premises on a continuous plot of ground, including any buildings thereon, that is not separated by a public thoroughfare, transportation right-of-way, property owned or used by others, or body of water not under the same ownership.

b) Non-contiguous Property – An owner or user protected premises, where two or more protected premises, controlled by the same owner or user, are separated by a public thoroughfare, body of water, transportation right-of-way, or property owned or used by others.

5.88 PROPRIETARY FIRE ALARM SYSTEM – An on-site facility in which the system is monitored at all times by trained personnel designated by the owners of the protected properties.

5.89 PROTECTED PREMISES – The physical location protected by a fire alarm system.

5.90 RELEASING DEVICE (NON-EXTINGUISHING AND NON-WATER BASED) – Products intended to support loads in connection with releasing automatic or manual operating devices. Examples include solenoids, relays, and actuators, holder/release devices, and devices intended to actuate the locking or unlocking of exits.

5.91 RELEASING DEVICE SERVICE – The control of building safety systems by the fire alarm system (e.g. sprinkler pre-action systems and extinguishing systems). Examples of items which may be controlled include elevators, smoke control and venting systems, fire doors, and extinguishing systems.

5.92 REMOTE ACCESS – A connection between a remote device and a system that enables bi-directional data communications that is not associated with fire signal receiving centre/supervising station unit service.

5.93 REMOTE CONNECTION – A connection on the control unit or transponder which provides status information to remote receiving equipment or a fire signal receiving center.

5.94 REMOTE RECEIVING EQUIPMENT – Control units and/or transponders that receive information from control units and/or transponders in other buildings.

5.95 RESET – A control function that attempts to return a system or device to its normal non-alarm state.

5.96 RESPONSE TIME – The time lapse from the occurrence of an alarm or supervisory input status change or trouble condition to activation of system outputs.

5.97 RISK OF ELECTRIC SHOCK – A risk of electric shock is determined to exist within a circuit unless that circuit meets one of the following criteria:

a) The circuit is supplied by an isolating source such that the maximum open-circuit voltage potential available to the circuit is not more than 30 V AC rms, 42.4 V DC, or 42.4 V peak; or

b) The circuit is supplied by an isolating source such that the current available through a 1500 Ω resistor connected across any potential in the circuit (including to ground) does not exceed 5 mA.

5.98 RISK OF FIRE – A risk of fire is determined to exist within a circuit unless that circuit meets both of the following criteria:

a) The circuit is supplied by a power source such that the maximum open-circuit voltage potential available to the circuit is not more than 30 V AC or 42.4 V DC or peak; and

b) The circuit in which the power available to the circuit is limited to a value less than 15 W.

5.99 SATELLITE/SUBSIDIARY STATION – A normally unattended location capable of being manned, but removed from the supervising station and linked to the supervising station by communication

channel(s). This location interconnects signal-receiving equipment or communications channel(s) from protected buildings or premises to the supervising station.

5.100 SECONDARY POWER SOURCE – Provides power when the primary power source fails.

5.101 SEQUENTIAL DISPLAY – Any visual indicating means which is not capable of displaying all events simultaneously.

5.102 SHORT CIRCUIT FAULT – A circuit impedance decrease sufficient to prevent normal operation.

NOTE: Short-range radio frequency device links are commonly referred to as wireless device links and may be subject to the requirements of Innovation, Science, and Economic Development Canada Radio Standards Specification.

5.103 SIGNALING – Operation of audible and/or visual devices for the purpose of indicating an alert signal or an alarm signal condition.

5.104 SIGNALING LINE CIRCUIT INTERFACE – A system component that connects a signaling line circuit to any combination of initiating devices, initiating-device circuits, notification appliances, notification appliance circuits, system control outputs, and other signaling line circuits.

5.105 SIGNALING TYPES:

a) Alarm Signal – A signal indicating an emergency condition requiring immediate action such as a signal indicative of a fire.

b) Alert Signal – An audible signal to advise designated persons of a fire emergency.

c) Coded Signal – Signal pulsed in a prescribed code for each round of transmission which conveys information to identify the location from which the status-change signal originated.

d) Delinquency Signal – A signal indicating the need for action in connection with a guard tour.

e) Distinctive Signals – Signals obtained from different sounding appliances (such as bells, horns, sirens, and buzzers) or from a single appliance (such as an electronic horn) where a continuous signal is obtained under one condition and a pulsing signal under another.

f) Evacuation Signal – Distinctive signal intended to be recognized by the occupants as requiring evacuation of the building.

g) Guard Tour Supervisory Service Signal – A supervisory signal monitoring the performance of guard patrols.

h) Noncoded Signal – Signal from a notification appliance that does not give information on the location of the initiating device which is in the alarm condition.

i) Supervisory Signal – A visual and audible indication of the active status of equipment that has been installed for the protection of life and property.

j) Trouble Signal – An indication of a fault condition of any nature, such as a circuit break or ground or other trouble condition occurring in the device or wiring associated with a protective signaling system.

5.106 SIGNAL TRANSMITTING UNIT – A communication device that transmits signals from the protected premises to the fire signal receiving centre/supervising station.

5.107 SITE SPECIFIC DATA – Alterable data required for the control unit to operate in a defined system configuration (e.g., labelling, zoning, alarm organization).

5.108 SMOKE CONTROL SYSTEM – An engineered system that utilizes mechanical fans and dampers to produce airflows and pressure differences across smoke barriers to limit and direct smoke movement.

5.109 SMOKE DETECTOR – A fire detector designed to operate when the concentration of airborne combustion products exceed a pre-determined level.

5.110 SOFTWARE – Programs, instructions, procedures, data, and the like that are executed by a central processing unit of a product and which influences the functional performance of that product. For the purpose of this standard, software is one of two types:

a) Executive Software – Control and supervisory program which manages the execution of all other programs and directly or indirectly causes the required functions of the product to be performed.

b) Site-Specific Software – Program that is separate from, but controlled by, the executive software which allows inputs, outputs, and system configuration to be selectively defined to meet the needs of a specific installation.

5.111 SPECIFIC TROUBLE INDICATION – A trouble signal which consists of a common trouble signal and a specific visual indication which identifies the failed circuit or item of equipment, or operational malfunction.

5.112 SPEECH POWER – Rated output power while delivering audio frequency signals over the product's rated frequency band within the constraints of the distortion limits specified in this standard.

5.113 STAND ALONE CAPABILITY – An optional feature where, under conditions of data communication link failure, control units and/or transponders are capable of receiving inputs and activating outputs in the area served by that control unit and/or transponder.

5.114 STANDBY BATTERY – Batteries used to provide a secondary power source.

5.115 STATIONARY EQUIPMENT – Any product that is intended to be fastened in place or located in a dedicated space and is provided with a power-supply cord for connection to the supply circuit.

5.116 STATUS CHANGE INDICATION – An indication that results from the change of state of an input circuit from normal to activated.

5.117 STORAGE BATTERY (RECHARGEABLE BATTERY) – Any battery which, by design or construction, is intended to be recharged.

5.118 SUPERVISING STATION – A facility that receives signals and at which personnel are in attendance at all times to respond to these signals.

5.119 SUPERVISING STATION SIGNAL PROCESSING EQUIPMENT – Computer based information technology equipment located at a supervising station, subsidiary station, or remotely located in the signaling path which receives, processes and displays alarm, supervisory and trouble signals for central station, remote station or proprietary services.

5.120 SUPPLEMENTARY – Refers to equipment or operations not required by this standard.

5.121 SUPPLEMENTARY DISPLAY – Refers to a display not required by this standard.

In Canada only:

NOTE: A supplementary display is referred to as an ancillary display.

5.122 SWITCHED-TELEPHONE NETWORK – An assembly of communications facilities and central-office equipment operated jointly by authorized service providers that provides the General public with the ability to establish transmission channels via discrete dialing.

5.123 THREE CHANNEL SELECTIVE ZONE SYSTEM – An emergency voice communication system capable of providing three separate audio signals simultaneously to selected zones.

5.124 TONE GENERATOR – A device intended to generate an electronic signal that, when amplified and introduced into speakers, produces a non-prerecorded, non-vocal, audible signal recognizable as indicating an evacuation condition.

5.125 TRANSMISSION INTERFACE UNIT – A device that provides means to transmit fire alarm system control unit status to remote transmitting, receiving and proprietary fire protective signaling systems equipment.

5.126 TRANSMITTER – A system component that provides an interface between a protected premises unit and the transmission channel.

5.127 TRANSPONDER – A component in a distributed type system, which is capable of receiving inputs and activating outputs and that communicates the status of such devices to the fire alarm system.

5.128 TRUNK FACILITY – The part of the communications channel that connects two or more leg facilities to a central supervising or satellite station.

a) Primary Trunk Facility – The part of a communication channel that connects all leg facilities to a central supervising or satellite station.

b) Secondary Trunk Facility – The part of a communication channel that connects two or more, but not all, leg facilities to a primary trunk facility.

5.129 TWO-STAGE SYSTEM – A system in which an alert signal sounds on any fire-input activation in conjunction with selective alarm signals.

5.130 USER – An individual who operates or services the product.

5.131 VOICE ALARM – General alarm or selective alarm signal by means of live paging and may also include automatic voice messaging.

5.132 WIDE AREA NETWORK (WAN) – A high speed communication network that spans beyond a group of buildings that includes part of the public communications network.

5.133 WIRE-TO-WIRE FAULT – A wire-to-wire (short circuit) fault is determined to be a resistance of 0.1 Ω or less across the circuit.

5.134 ZONE – A defined area within the protected premises. A zone defines an area from which a status indication can be received or an area in which a form of control can be executed.

a) Input Zone – An area or field device within a building which initiates annunciator indication as required by government laws, codes or standards, or other parts of this Standard.

b) Notification Zone – An area covered by notification appliances that are activated simultaneously.

6 Information for Assessment

6.1 The following documentation may be required to determine compliance:

a) Schematic diagrams of all circuits;

b) Bill of materials;

c) Component layout drawings;

d) Assembly drawings;

e) Component specifications;

f) Marking to be applied to the product as required in Sections 62 – 64, Markings;

g) Installation wiring diagram/instructions as required in Section 65, Installation Wiring Diagram/Instructions;

h) Operating instructions as required in Section 66, Operating Instructions;

i) Least favorable system response time calculations showing compliance with the timing requirements of this Standard for any system configuration as described in the Installation Instructions; and

j) Software Integrity information as defined in 10.2.

SOFTWARE

7 General

7.1 Any product that is dependent upon software program(s) to achieve proper operation shall meet all the requirements in this section.

7.2 Where compliance with this standard is dependent upon the proper selection of software features and parameters which are field programmable, one of the following shall be met:

a) The software shall not permit any product operation or contain any programming options that are prohibited by this standard;

b) The software shall be partitioned and identified in the field programming software as complying or not complying with (a); or

c) A summary as described in 65.24 shall be provided in the front of the programming manual describing all programming options and parameters that have the potential for conflicting with the requirements in this standard and stating the proper program selections that would be in accordance with this standard.

Additionally, information shall also appear throughout the manual where the specific feature or option appears describing the requirements of this standard.

7.3 A release level shall identify the executive software of a product. A new release level shall be assigned due to any changes in the executive software.

7.4 With the executive software resident in the product, the release level of the software shall be visibly marked on the product or shall be capable of being displayed on a visual annunciator provided as part of the unit.

7.5 All software shall be resident in nonvolatile storage devices that are sealed against atmospheric contaminants and not subject to mechanical wear of the storage medium. Integrated circuits and sealed hard disk drives are examples of storage devices that meet this requirement.

Exception: Software and data that is of a supplementary nature or software used to initially program the product.

7.6 Where the design of the product requires that status-change signals be stored in memory in order for the signal to be displayed by the control unit, the software shall have sufficient capacity to store not less than the following number of concurrent status changes:

a) Protected premises unit – Total number of initiating-device circuits plus initiating devices connected to all signaling line circuits up to a maximum of 10 or 10 % of the total, whichever is greater.

b) In the United States only: Supervising station unit – 10 % of the total number of transmitters on all transmission channels up to a maximum of 500.

7.7 Where status-change signals are stored in memory and the memory capacity is not capable of storing all possible signals simultaneously, the software design shall prohibit the overflow condition causing corruption of existing stored data or causing the control unit to perform in a degraded mode with regard to the status changes which are stored in memory.

7.8 Software within a fire alarm control system that interfaces to software in another system to provide required functions shall be functionally compatible and the compatibility shall be indicated in the installation instructions of one or both of the compatible systems. This does not apply to supplementary functions.

8 User Access and Programming

8.1 The executive program shall not be accessible for change, modification, or addition by the user, nor shall program execution depend upon site specific programming by the user.

8.2 Site-specific programming is not prohibited from being performed at the factory or in the field. When the product permits programming in the field, the extent of the programming shall be limited to the following:

a) Assignment and mapping of protected premises output circuits where there is a procedure or product feature that allows the programmer or AHJ to readily verify and review all programming. Mapping of input circuits to a supervising station transmitter output circuit is not permitted and shall be automatically accomplished by the executive program;

b) Setting of parameters and variables that relate only to topics influenced by use and installation of the product; and

c) In the United States only: Actuation of the supervising-station receiver output circuits (audible visual, recording) shall be automatically accomplished by the executive program without user input.

8.3 A security means shall be provided to restrict unauthorized access to site specific programming. The restriction shall be by physical means or use of access code or special tool. An access code shall provide a minimum of 1000 possible combinations. The security means shall not be the same as the access

means provided to enable the products operational controls or features. The use of different passwords meets the intent of this requirement.

In Canada only:

NOTE: Refer to A5.2.3.

8.4 Initial site-specific programming or any subsequent reprogramming of a protected premises unit shall require manual actuation of the security means at the protected-premises unit. Once activated, programming may be completed on-site or downloaded from an off-site location.

In the United States only:

Exception No. 1: For a proprietary system intended to protect only contiguous properties, program downloading from the supervising station without manual actuation at the protected premises unit is permitted.

Exception No. 2: The telephone numbers associated with a DACT are permitted to be reprogrammed from an off-site location without manual actuation at the protected-premises unit.

8.5 When the proper operation of a product is adversely affected due to actuation of the security means or during any reprogramming, the product shall produce a visual trouble signal.

8.6 In the United States only: A protected premises unit connected to a supervising station receiver shall transmit a trouble signal.

9 Software Monitoring

9.1 The execution of the software shall be monitored. The monitoring means or watchdog shall initiate a trouble signal if routines associated with the required functions of the program are not executed.

9.2 The function of the monitoring or watchdog, and the trouble signal shall not be prevented by a failure in the execution of the Software.

9.3 The trouble signal shall result for any occurrence of the following malfunctions:

a) The system does not execute its program due to a hardware or software fault.

b) The memory function of the microprocessor does not function or is corrupted.

c) Rotation ceases, or fails to start when required, in a system that incorporates memory-storage devices having rotating elements.

Exception: Supervision is not required when malfunction of the memory-storage device results only in loss of supplementary information or features, and when the system is still capable of indicating the nature and location of any status change.

9.4 Memory for assignment of and allocation of ancillary functions and/or operations shall be protected as detailed in Section 8, User Access and Programming.

9.5 The executive software of a control unit, upon which any mandatory requirements are predicated, shall be stored in memory in a format so as not to be accessible for modification. When required, executive software shall be replaced in accordance with the manufacturer's instructions.

10 Software Integrity

10.1 The software design shall cause the product to operate as intended and shall not contain known critical defects which result in interruption of product operation, operation not intended by the design of the product, or which is inconsistent with the requirements of this standard.

10.2 With regards to 10.1, evidence of software integrity shall be any of the following:

a) Software development using a documented process, which includes the test procedures, with anticipated test results, specified in 10.4 and which complies with the requirements of ISO 9001.

b) Examination of the software operation by the manufacturer with a test and verification program that is documented with a test plan and test results which, at a minimum, includes verification of the items specified in 10.4.

10.3 Documentation for 10.2 (a) and (b) shall include a description of the test methods used, test result(s), and identification of test equipment.

10.4 The test program specified in 10.2 shall include performance-based testing of the functions as follows:

a) Confirmation of proper operation of all circuits of each applicable type, style and class, verified as described.

1) Supervised initiating device circuits:

i) Subjecting the circuit to fault conditions (short, open, ground) and verifying that the condition is detected and the system responds as required.

ii) Verify the circuit will detect and respond to an alarm or, if applicable, supervisory condition, and that the system responds as required.

iii) Verify that the alarm verification cycle completes correctly.

2) Supervised output (notification appliance, master box, releasing, etc.) circuits:

i) Subjecting the circuit to fault conditions (short, open, ground) and verifying that the condition is detected and the system responds as required.

ii) Verify the circuit activates correctly when commanded by the system.

iii) Verify that the output signal is recognizable and complies with all timing requirements.

3) Communication and transmission circuits:

i) Subjecting the circuit to fault conditions (short, open, ground) and verifying that the condition is detected and the system responds as required.

ii) Verify that messages are transmitted correctly in response to system stimuli.

iii) Verify that incorrect messages are processed appropriately.

4) Signaling line circuits:

i) Subjecting the circuit to fault conditions (short, open, ground) and verifying that the condition is detected and the system responds as required.

ii) Verify that a minimum of at least 1 message, per type, is transmitted correctly as required.

iii) Verify that incorrect messages are processed appropriately.

iv) Verify that mismatches between the actual devices on a circuit and the expected devices on a circuit are detected and reported correctly.

b) Confirmation of proper operation of visual annunciators and displays:

1) Verify that at least 1 event, per type, intended for the display and/or annunciator is successfully routed to and displayed by the display and/or annunciator.

2) Verify that events not intended for the display and/or annunciator are not displayed.

c) Confirmation of proper operation of manual controls:

1) Verify that all key presses are processed.

2) Verify that all key presses and menu selections generate the expected action.

3) Verify that incorrect entries are rejected and do not cause abnormal system operation.

d) Confirmation of proper operation of all programming options:

1) Verify that programming options cause the operation intended.

2) Verify that incorrect entries are processed appropriately.

e) Confirmation of proper operation of intelligent devices that are controlled by the panel:

1) Verify that the panel correctly controls the device as designed.

10.5 The testing information specified in 10.2 (b) and (c) shall be submitted for review for any new products and whenever functions are added to the software of an existing product.

11 Compare Program (Optional)

11.1 Where a compare program is provided, 11.2 – 11.6 shall apply.

11.2 A means shall be provided to identify the revision number or version of the installed site specific data.

11.3 The process of comparing presently installed site specific data to a revised or incremented version must occur prior to downloading to a control unit or transponder.

11.4 The compare program shall provide an accurate means of identifying all system changes, additions, and deletions. Changes to be identified shall include: system timer settings, hardware, customer defined location messages, and site specific input to output correlations.

11.5 The compare program or method of comparing site specific data shall produce a detailed report that clearly identifies all system changes and can be stored and/or printed at a later date. Refer to 11.6 for report specifics.

11.6 The compare program, or method of comparing site specific data report shall include the following summary:

a) Project name, executive software version, site specific data revision number, including time and date stamp, plus last update time and date;

b) Control unit and/or transponder summary to include additions, deletions, and changes to installed hardware, timer and default settings;

c) Active device summary to include device additions, deletions, and changes including customer programmable messages; and

d) Programming or correlation summary that identifies all programming additions, deletions, and changes.

12 In Canada Only: Field Detection Device Activity Report

12.1 This section shall not apply to Fire Alarm Control Units that operate solely with Conventional Field Devices.

12.2 Where a Field Detection Device Activity Report of system events is available (and maintained by the control panel's software), the Field Detection Device Activity Report extraction process (ACCESS LEVEL 3 or less) shall provide, as a minimum:

a) Time Stamp of Event (Date, Month, Year, Time of Day in h/min);

b) Annunciator Label/LCD Text Displayed (Specific location of Device within building);

c) Zone Identifier, or Device Type and Address (Smoke, Heat, Manual, Duct, Waterflow, Tamper, etc.); and,

d) Type of Event (Fire Alarm, Supervisory, Trouble, etc.)

NOTE: All information will be shown in plain text format (without encryption).

INTERCONNECTED FIRE ALARM CONTROL UNITS AND ACCESSORIES

13 General

13.1 The interconnections of fire alarm control units and/or control unit accessories intended to function as a single system shall be monitored for integrity in accordance with Section 23, Circuits.

13.2 The faults required by 13.1 shall not affect the intended synchronization of visual or audible notification appliances.

13.3 Each interconnected control unit shall have the capability of being monitored separately for alarm, trouble, and supervisory conditions, as applicable.

13.4 Unless interconnected control units located at a protected premises are intended to be installed such that the display annunciation at each unit can be simultaneously observed, alarm, supervisory, and trouble conditions, as well as reset, alarm silence, or trouble silence actuation originating at any unit shall be annunciated at each control unit and non-supplementary operator interface.

13.5 The time periods for processing and activation of signals between interconnected units shall comply with 22.3.2, 30.2.1.2, and 34.2.1.1, as applicable.

13.6 The programming of initiating, notification, and signaling points of the interconnected/networked system shall comply with Sections 7 – 12, Software.

13.7 Relays or modules providing signaling between interconnected fire alarm control units shall be arranged to produce a trouble signal at the interconnected unit(s) when all power to the relay or module is removed.

13.8 The operation of relays or other modules providing alarm, supervisory, or trouble (or the like) output signaling shall operate as described for one of the following categories:

a) Common – Operates for all of the signals relative to its type (such as alarm, trouble, supervisory).

b) Zone – Operates for specific zone/circuit input signals (non-programmable).

c) Programmable – Operates for any signals for which it is programmed.

13.9 The function of the relay or output module shall be clearly defined in the installation wiring diagram/instructions for the product.

13.10 Interconnected fire alarm units shall be arranged to function as a single system with respect to the resetting of alarm signals and not require the simultaneous operation of multiple reset switches or the disconnection of any wiring or equipment to reset the alarm system.

LOCAL AREA NETWORKS AND/OR WIDE AREA NETWORKS (LAN/WAN)

14 General

14.1 The following equipment relating to LAN/WAN shall be in compliance with all applicable requirements of this Standard:

a) Fire related equipment that is critical to processing or transporting required fire alarm data, for example repeaters, switches, bridges, routers and protocol translators; and

b) Non-fire related equipment that allows access to LAN/WAN communication circuits installed to prevent the impairment of fire equipment from non-fire equipment, for example barriers, gateways, or system isolation components and other related equipment.

14.2 Where LAN/WAN is dedicated to fire processing, it shall comply with 14.1.

14.3 Where the LAN/WAN is shared by other premises operating systems, (including Local and Wide Area Networks – LAN/WAN) operation shall be in accordance with the following in addition to 14.1:

a) All programming and system configurations shall assure a fire alarm system priority in accordance with Section 24, Signal Priority;

b) All programming and system configurations shall assure a fire alarm system response time in accordance with 22.3, System Response;

c) Short circuit faults, open circuit faults, or ground faults in the non-fire system equipment or the connections between the non-fire system equipment and the fire alarm products shall not impair the required operation of the fire alarm system or prevent the required alarm, supervisory, or trouble annunciation and signaling;

d) The monitoring for integrity as described in 72.2.1, shall continue to be met during the period the system is used for non-fire purposes, for example General paging;

e) Non-fire functions shall not impair any required operation of the fire alarm system;

f) Fire alarm visual displays and local audibles shall be distinctive and clearly recognizable over any other signal even when a non-fire alarm signal is initiated first, and shall be in accordance with Table 20.3;

g) Fire alarm signaling output circuit operation shall have priority over any other signal even when a non-fire alarm signal is initiated first, and be in accordance with 23.5, Signaling/Notification Appliance Circuit Operation;

h) A trouble signal shall be indicated as required in 20.2, Trouble Signals, if the response time is exceeded; and

i) Failure of any equipment that is critical to the operation of the fire alarm system shall indicate a trouble at the fire alarm control unit and/or display and control center within 90 s as required in 20.2, Trouble Signals.

j) In Canada only: System bandwidth shall be monitored to confirm that all fire alarm communications of the fire alarm system shall meet the requirements of Table 22.1.

14.4 To determine compliance with 14.3, the operation, removal, replacement, failure, or maintenance procedure on any hardware or software network components, or circuit not performing any of the fire alarm system functions shall not cause loss of any of the fire alarm functions, including supervision, or prevent required alarm, supervisory, or trouble signaling, or actuation.

14.5 Communication of alarm, supervisory, and trouble signals shall be in a highly reliable manner to prevent degradation of the signal in transit. Reliability of the signal shall be in accordance with 34.5.7.6.

DEGRADED AND STAND-ALONE OPERATION

15 General

15.1 Where distributed systems utilize control units and transponders provided with stand alone capability and/or degraded mode capability, each control unit and transponder shall have signal silence, reset and trouble silence switches with visual indicators, degraded mode capability and stand alone capability indicators, which become active only in degraded and stand alone modes.

15.2 Where distributed systems utilize control units and transponders provided with stand alone capability and/or degraded mode capability, each control unit and transponder shall operate in accordance with 15.3 and 15.4 within 300 s. Upon restoration of communication, control units and transponders shall return to normal operation within 300 s.

15.3 Stand alone and degraded mode operation, enabled through pre-programmed software, shall maintain communication to all control units and transponders remaining connected and communicating using the data communication link. Any control unit or transponder not able to communicate by degraded mode shall default to operations in stand alone mode.

NOTE: Where multiple faults cause the network to be severed, it is intended for each portion of the network to function as intended within the capacities of each section.

15.4 In stand alone and degraded mode operation, the activation of an alarm input shall cause the segment of the system remaining in communication to:

a) Operate the alert signals and alarm signals in accordance with the system operating sequence; and

b) Operate local relays in control units and transponders connected to ancillary devices in accordance with the system operating sequence.

POWER SUPPLIES

16 General

16.1 Each product shall be supplied by at least two independent power sources (one primary and one secondary), each of which is able to separately power the product.

In Canada only:

Exception No. 1: Wireless products complying with 19.1, 23.8 and Section 97 are not prohibited from using a primary battery as the sole source of power.

In the United States only:

Exception No. 2: Products complying with 19.1 are not prohibited from using a primary battery as the sole source of power.

16.2 The interruption and restoration of any source of electrical energy connected to a product shall not cause an alarm signal.

16.3 A main power supply loss-restoration cycle shall not result in an abnormal operation. Rectifiers and battery chargers whether integral with the product or assembled for separate installation are considered elements of the product and are subject to the same requirements.

16.4 Transfer of the operating power to the secondary power source or return to the primary operating power source shall not cause the loss of any system status signaling condition.

16.5 A visual “power-on” indication, visible after the product is installed, is to be present on all products employing an operator interface. A unique character presentation on a display device meets the intent of this requirement.

17 Primary Power Source

17.1 All primary power source(s) shall be monitored for the presence of voltage at the point of connection to the product such that, after reaching the voltages specified in 17.3, the following shall occur:

a) A specific trouble indication shall be annunciated at the protected premise for all products located at a protected premises;

b) A trouble signal shall be transmitted for:

1) In Canada only: Products intended to interconnect to a transmission interface shall have capability to delay the loss of primary power specific trouble transmission up to 3 h;

2) In the United States only: Remote station, central station, and proprietary-type protected premises units after a delay of 60 to 180 mins;

Exception: Products are not prohibited from providing capability of selecting that the primary power failure trouble signal transmission be delayed other time periods, including no delay, provided the delays above are also included.

c) Primary power failure transmission is not required if primary power is restored within the delay time.

1) In the United States only: Either an audible- or visual-only trouble signal, or both, shall be annunciated at the supervising station for supervising station equipment.

Exception: The primary power source of constantly attended supervising-station equipment, when the fault condition is obvious to the operator on duty.

17.2 The requirement of 17.1 does not apply to the following circuits:

a) A power supply for supplementary equipment;

b) The neutral of a three-, four-, or five-wire AC or DC supply source.

17.3 Operating power of the product shall automatically be transferred to the secondary power source within 10 s without required signals being lost, interrupted, or delayed by more than 10 s and while maintaining compatibility of connected equipment when each of the following conditions occur:

a) Total instantaneous loss of primary power.

b) Degradation of primary power to the point of transfer to secondary power.

17.4 Transfer to the secondary power source shall not occur below 85 nor above 90 % of rated voltage. Restoration of the primary operating source to a value of not more than 90 % of rated voltage shall result in the transfer of product operation to the primary operating source within 30 min.

Exception No. 1: A lower transfer cutout voltage is not prohibited when operation of the product is not impaired and compatibility of connected appliances is maintained.

Exception No. 2: Restoration of the primary power source of a smoke control system to a value of not more than 90 % of rated voltage shall result in the transfer of product operation to the primary power source within 15 min.

In the United States only:

Exception No. 3: The transfer for equipment located at a supervising or subsidiary station shall occur within 60 s and required signals shall not be lost, interrupted, or delayed more than 90 s after occurrence of the indicated conditions.

17.5 For units employing a rechargeable battery as the secondary power source, that does not utilize a transfer cutout scheme (such as a float-type battery charger), the trouble indication required by 17.1 shall occur as described in 18.6.

17.6 For units employing an uninterruptible power source, a trouble signal shall be initiated when the uninterruptible power source system switches from the primary power source to the secondary power source.

17.7 In Canada only: When a control unit and its accessories require two or more supply circuits, the installation wiring drawing required by Section 65, Installation Wiring Diagram/Instructions, shall detail grouping, identification and warning markings of the disconnecting means as required by CSA C22.1, Fire Alarm Systems, Smoke Alarms, Carbon Monoxide Alarms, and Fire Pumps.

17.8 In Canada only: Loss of any operating primary power supply to an emergency power supply shall result in:

a) A specific trouble indication;

b) Immediate (less than 1 s) automatic transfer to the emergency power supply; and,

c) Where a building emergency supply system is provided, the transfer to a building emergency supply system shall be in accordance with the National Building Code of Canada, Emergency Power for Fire Alarm Systems.

18 Secondary Power Source(s)

18.1 All secondary power source(s), other than those used solely to sustain time and date functions or volatile memory, shall be monitored for the presence of voltage at the point of connection to the product such that loss of voltage shall result in:

a) The annunciation of an audible and visual trouble signal at the protected premises for any product located at the protected premises;

b) The transmission of an off premise trouble signal for remote station, central station, and proprietary-type protected premises units; and

c) In the United States only: The annunciation of either an audible- or visual-only trouble signal, or both, at the supervising station for supervising-station equipment.

18.2 The system shall produce the same alarm, supervisory, and trouble operation signals and indications, excluding the alternating current (AC) power indicator, when powered solely from its secondary power source as when the product is connected to its primary power source.

Exception: Amplifiers for an emergency audio announcement and paging alarm system are not required to remain energized when they automatically re-energize for alarm and failure of an amplifier results in an audible trouble signal when an alarm is present on the system.

18.3 Standby batteries, other than those used solely to sustain time and date functions or volatile memory or microcontroller functionality pertaining to fail-safe fire door release devices, shall be rechargeable.

18.4 If non-rechargeable standby batteries are used to sustain microcontroller functionality in a fail-safe fire door release device that is not also an extinguishing or water-releasing device, the following shall apply:

a) A Standby battery voltage levels shall be monitored by the device. The standby battery voltages shall be observed at least once every:

1) In Canada only: 90 s;

2) In the United States only: 200 s;

b) A trouble signal shall be annunciated should the standby battery capacity fall below the level at which the standby battery is able to provide 24 h of normal operation in the absence of primary power. The trouble signal shall persist for no fewer than 30 d, or until the battery has been replaced.

c) Any failure of the standby batteries, including removal, or voltage drop below that which is required to operate the circuitry, shall result in the release of the door. Should failure occur while primary power is still functional, the device shall execute the normal release sequence, and a trouble signal shall be annunciated. Should the failure occur during a loss of primary power, the door shall immediately release.

d) The device manual shall state that replacement of the standby batteries is to be performed whenever the standby battery has failed, or a standby battery replacement trouble code is generated.

e) The standby battery shall be capable of providing no less than 24 h of power to the circuitry that it powers during a loss of primary power.

18.5 Products employing rechargeable batteries as the secondary power source shall monitor the integrity of the battery-charging circuit.

18.6 With regards to 18.5, products employing voltage-controlled charging methods shall initiate a trouble signal when the charging voltage decreases below the marked nominal rated battery voltage.

19 Primary Batteries

19.1 Primary batteries are permitted when all of the following conditions are met:

a) The capacity of the primary batteries shall be monitored for integrity. The batteries shall be monitored while loaded by:

1) The operating mode of the product requiring the most power; or

2) A load equivalent to the operating mode of the product requiring the most power.

b) A required battery trouble status signal shall be transmitted to the receiver and indicated at the fire alarm operator interface for a minimum of 7 d before the battery capacity of the transmitter/transceiver/product has depleted to a level insufficient to maintain proper non-alarm operation of the transmitter/transceiver/product.

c) The battery trouble signal annunciation at the receiver/control unit is not prohibited from initially being delayed up to 4 h.

d) The battery trouble signal shall be retransmitted at intervals not exceeding 4 h or the product locks in the signal to the control unit until the battery is replaced.

Exception: Transmitter/transceiver/receiver combinations utilizing two-way communication where all of the following conditions are met:

1) The transceiver/receiver acknowledges receipt of the change of status signal to the corresponding transceiver/transmitter; and

2) The receiver/control unit annunciates the current trouble status of the corresponding input or output RF device after manual reset of the receiver/control unit.

e) Batteries (of the transmitter/transceiver/product) shall be capable of operating the transmitter/transceiver/product, including the initiating device (if powered by the same battery), for not less than 1 year of normal signaling service before the battery depletion threshold specified in 19.1(b) is reached.

f) Annunciation of the battery trouble status signal at the fire alarm operator interface shall be distinctly different from alarm, supervisory, tamper, and initiating circuit trouble signals. It shall consist of an audible and visual signal that shall identify the affected transmitter/transceiver/product.

g) The audible trouble signal of the fire alarm operator interface is not prohibited from being silenceable when provided with an automatic feature to resound the signal at intervals not exceeding 4 h.

h) The battery trouble status signal shall persist at the fire alarm operator interface until the depleted battery has been replaced.

i) Any mode of failure of a primary battery in a device shall not affect any other device.

j) Where a single battery failure affects the intended operation of the transmitter/transceiver/product, each transmitter/transceiver/product shall serve only one device and shall be individually identified at the fire alarm operator interface.

k) A transmitter/transceiver/product shall be permitted to serve more than one device when all the following are met:

1) Multiple batteries are used;

2) A single battery failure does not affect the operation of transmitter/transceiver/product;

3) Each battery shall be individually monitored for battery depletion as described in 19.1(a);

4) Each battery upon reaching depletion shall cause the transmitter/transceiver/product to transmit a low battery trouble signal as described in 19.1(b); and,

5) Each transmitter/transceiver/product shall be individually identified at the fire alarm operator.

ON PREMISE

20 Control Unit Visual Display

20.1 General

20.1.1 Each input zone of a control unit shall be annunciated for normal to activated status change.

Exception: A product having a single input zone does not require specific zone annunciation.

20.1.2 A printout shall not be acceptable as the only means of annunciation.

20.1.3 Fire alarm signals, supervisory signals, trouble signals, and other signals shall result in distinctly different annunciation.

20.1.4 Visual displays and associated controls shall have the capability of being located and grouped for viewing and operation by one person from one location.

20.1.5 Alarm, supervisory, and trouble signals shall be indicated at the following locations:

a) In Canada only: Display and Control Centre (DCC), and annunciators, if provided.

b) In the United States only: Operator interface at the protected premises for local-type service and building fire command center for emergency voice/alarm communications systems.

20.1.6 In Canada only: Visual displays shall provide indication of system activity by means of discrete indicators or discrete text messages on an electronic display in accordance with Table 20.1 or Table 20.2.

20.1.7 In Canada only: A visual display utilizing illumination state for status change indication shall observe indication sequence Options A or B, as shown in Table 20.1.

20.1.8 In Canada only: A visual display utilizing illumination state for trouble shall observe indication sequence Options A or B, as indicated in Table 20.2.

20.1.9 In Canada only: The following requirements shall apply to all visual displays for the control unit, display and control centre, and remote annunciator:

a) Where colour is used, colour shall be in accordance with Table 20.3;

b) Where colour is used, the colour red shall be limited for indication of zones/devices in alarm and those circuits used for an alarm signal and an alert signal;

c) Where a common colour is used for functions identified in Table 20.3, separate indicators shall be provided; and

d) Label designations shall comply with Table 20.4 and Table 20.5 or its equivalent.

20.1.10 In Canada only: A means shall be provided to clearly indicate that the displayed information is either:

a) A fire alarm signal;

b) Life safety emergency condition;

c) Fire supervisory signal;

d) Property and building safety;

e) Trouble; or

f) Other conditions.

20.1.11 Non-electrical visual annunciation integral with a switch shall include obvious distinct indications for all switch positions. Utilization of the switch position does not meet the intent of complying with this requirement.

In Canada only:

Table 20.1
Visual Display Status Change Indication by Illumination State

Status or status change	Indication sequences			
	Non-latching		Latching	
	Option A	Option B	Option A	Option B
Normal	Off	Off	Off	Off
Normal to Achieved	Flashing or Steady	Flashing	Steady On	Flashing
Acknowledged Activated	Not Applicable	Steady On	Not Applicable	Steady On
Activated to Normal	Off	Off	Steady On	Steady On
Reset System to Normal	Off	Off	Off	Off

NOTES:

1) Status change indication by change in the intensity of illumination is not acceptable.

2) Option A to be applied when acknowledge feature is not used, and Option B to be applied when acknowledge feature is used and event acknowledge control is provided.

In Canada only:

Table 20.2
Visual Display Trouble by Illumination State

Trouble states	Indication sequences			
	Non-latching		Latching	
	Option A	Option B	Option A	Option B
Normal	Off	Off	Off	Off
Normal to Activated	Flashing or Steady	Flashing	Flashing or Steady	Flashing
Acknowledged Activated	Not Applicable	Steady	Not Applicable	Steady
Activated to Normal	Off	Off	Flashing or Steady	Flashing or Steady
Acknowledged Return to Normal	Not Applicable	Not Applicable	Not Applicable	Steady
Reset to Normal	Not Applicable	Not Applicable	Off	Off
NOTE: Option A to be applied when acknowledge feature is not used, and Option B to be applied when acknowledge feature is used and event acknowledge control is provided.				

In Canada only:

Table 20.3
Visual Indicators – Colour Code

Function	Red	Yellow	Green	Other colour (blue, white, etc.)
Alarm Inputs	Mandatory	Not permitted	Not permitted	Not permitted
Alarm Signal	Mandatory	Not permitted	Not permitted	Not permitted
Alert Signal	Mandatory	Not permitted	Not permitted	Not permitted
Page Select	Not permitted	Not permitted	Optional	Optional
Signal Circuit fault	Not permitted	Mandatory	Not permitted	Not permitted
Ancillary Device 'on'	Not permitted	Optional	Optional	Optional *
Ancillary Device 'off'	Not permitted	Optional	Optional	Optional *
Telephone Call-in	Not permitted	Not permitted	Optional *	Optional
Telephone Select	Not permitted	Not permitted	Optional *	Optional
Telephone Circuit Fault	Not permitted	Mandatory	Not permitted	Not permitted
Inhibit	Not permitted	Mandatory	Not permitted	Not permitted
Preannounce	Not permitted	Optional	Optional	Optional
Supervisory Inputs	Not permitted	Mandatory	Not permitted	Not permitted
Carbon Monoxide	Not permitted	Optional	Not permitted	Optional
Power – on	Not permitted	Not permitted	Mandatory	Not permitted
Trouble Signal	Not permitted	Mandatory	Not permitted	Not permitted
Alarm Signal Silence	Not permitted	Mandatory	Not permitted	Not permitted
Automatic Alarm Signal Activation Timer	Not permitted	Optional	Optional	Optional

Table 20.3 Continued on Next Page

Table 20.3 Continued

Function	Red	Yellow	Green	Other colour (blue, white, etc.)
Automatic Alarm Signal Timer Cancelled (Acknowledged)	Not permitted	Mandatory	Not permitted	Not permitted
Discharge	Optional	Optional	Not permitted	Optional
Pre-discharge	Optional	Optional	Not permitted	Optional
Emergency and building events	Not permitted	Optional	Not permitted	Optional
Smoke control	Refer to 31.3.6.			

In Canada only:

Table 20.4
Label Designations

Label designations in English[c]	Label designations in French[c]	Description of function
Acknowledge	Accusé De Réception	Event Acknowledge Control
Alarm	Alarme	Alarm Status Indication
Alarm Signal	Signal D'alarme ou Signal D'Alme	Alarm Signal Status Indication
Alarm Signal Activation or Alarm Signal ON	Activation Du Signal D'alarme ou Act. Sign. Alme.	Alarm Signal (Evacuation) Control
XXX[a] Alarm Signal Activation or XXX[a] Alarm Signal ON	XXX[a] Activation Du Signal D'alarme ou XXX[a] Act. Sign. Alme	Circuit Or Area Evacuation Manual Control
XXX[a] Alert Signal Activation or XXX[a] Alert Signal ON	XXX[a] Activation Du Signal D'alerte ou XXX[a] Act. Sign. Alerte	Circuit Or Area Alert Manual Control
XXX[a] By-pass	XXX[a] Dérivation	Ancillary Bypass
XXX[a] ON	XXX[a] Sous Tension	Ancillary Device Indication
XXX[a] OFF	XXX[a] Hors Tension	Ancillary Device Indication
Automatic Alarm Signal Timer Active or Automatic Alarm Signal Timer ON or Automatic Alarm Signal (followed by equivalent status)	Temporisateur Du Signal D'alarme Automatique Activé ou Temp. Signal Alme Autom. Act. ou Min. Signal Alme Autom. Act.	Automatic Alarm Signal "Evacuation" Timer Running
Automatic Alarm Signal Cancel or Automatic Alarm Signal Stop, or Automatic Alarm Signal (followed by equivalent status)	Annulation Du Passage Automatique Au Signal D'alarme ou Ann. passage autom. signal alme	Cancel Automatic Alarm Signal "Evacuation"
Automatic Alarm Signal Timer Cancelled or Automatic Alarm Signal Stopped, or Automatic Alarm Signal (followed by equivalent status)	Passage Automatique Au Signal D'alarme Annulé ou Min. signal Alme autom. ann.	Automatic Alarm Signal “Evacuation” Cancelled Indication
Building Safety or Bldg Safety	Sécurité Du Bâtiment ou Sécurité Du Bat	Common Indication Associated With Property And Building Safety
XXX[b]	XXX[b]	Specific Indication Associated With Property And Building Safety
Emergency and building events	Événements Liés Aux Urgences Et Aux Bâtiments ou Urg. ou Urg. Bat	Common Indication Associated With Emergency And Building Events
XXX[b]	XXX[b]	Specific Indication Associated With Emergency And Building Events

Table 20.4 Continued on Next Page

Table 20.4 Continued

Label designations in English[c]	Label designations in French[c]	Description of function
Fire Drill	Fire Drill Exercice D'incendie	Fire Drill Manual Control
XXX[b]	XXX[b]	Emergency Or Building Event Manual Control
XXX[a] Bypass or Disable	XXX[a] Dérivation ou Désactiver	Bypass or Disable of Input or
Activate XXX[a] or equivalent followed by XXX[a]	Activer XXX[a]	Initiate Manual Control Function
Page Inhibited	Radiomessage Interdit	Paging Inhibited Indication
Page Select XXX[a]	Sélection De Radiomessagae XXX[a]	Manual Control For Group Or Individual Paging
Power ON or Power	Sous Tension ou Marche	Primary Power Indication
Pre-announce	Pré-Annonce	Indication Of The Pre-Announcement Tone
XXX[a] Pre-discharge	XXX[a] Pré-Décharge	Extinguishing Agent Pre-Discharge Indication
Ready to Page	Prêt À Demander	System Ready To Page
XXX[a] Discharge or XXX[a] Release	XXX[a] Libération – ou XXX[a] Déclenchement	Extinguishing Agent Discharge Indication
Releasing Service Signal Silence	Arrêt Du Signal De Déclenchement D'extinction ou Arr. Sign. Ext. Arr. Sign. Décl. Ext.	Manual Signal Silence Control For Releasing Device Service
Remote Connection Bypass or equivalent	Dérivation De Raccordement À Distance ou Dér. Racc. Dist.	Bypass Connection For Fire Service Response
Reset or System Reset	Réarmement – ou Réarmement Du Système ou Réarm. SYST.	System Reset Manual Control
Signal Circuit Trouble	Défectuosité De Circuit D'avertisseurs ou Déf. Cct Avert.	Signal Circuit Fault Indication
Signal Silence – or Deactivate Alarm Signals	Arrêt Du Signal – ou Arrêt Du Signal D'alarme ou Arr. Signal Arr. Signal Alme	Alarm Signal Manual Deactivation
Signal Silence Inhibit	Arrêt Du Signal Neutraliser ou Arr. Signal Neutr.	Prevent Silence Of Signal For A Preset Time
Supervisory	Supervision	Common Indication Associated With Supervisory Inputs
XXX[a]	XXX[a]	Specific Indication Associated With Supervisory Inputs
Supervisory Signal Silence	Arrêt Du Signal De Supervision ou Arr. Sign. Sup.	Manual Signal Silence Control For Supervisory Signal
Telephone Call-in	Appel Téléphonique ou Appel Tel.	Common Telephone Call-In Indication
XXX[a] Telephone Call-in	XXX[a] Appel Téléphonique ou XXX[a] Appel Tél.	Specific Telephone Call-In Indication
XXX[a] Telephone Trouble	XXXv Défectuosité De Téléphonique ou XXX[a] Déf. TÉL.	Telephone Circuit Fault Indication
XXXv Telephone Select	XXX[a] Sélection De Téléphone ou XXX[a] Sél. TÉL.	Telephone Circuit Manual Control
Trouble	Défectuosité	Common Trouble signal Indicator
XXX[a] Trouble	XXX[a] Défectuosité	Specific, Circuit Or Area Trouble signal Indicator
Trouble Silence	Arrêt Du Signal De Défectuosité ou Arr. Sign. Déf.	Trouble Silence Manual Control

Table 20.4 Continued on Next Page

Table 20.4 Continued

Label designations in English[c]	Label designations in French[c]	Description of function
Visual Indicator Test or Lamp Test	Essai Des Indicateurs Visuels ou Essai Ind. Visuel	Visual Indicator Test Manual Control (Lamp Test)
Miscellaneous Terms		
Emergency		Urgence
For replacement only – complies with ULC 527-xx		Pour remplacement seulement – conforme à la norme ULC 527-xx
Neutral		Neutre
[a] Replace XXX with location and/or device specific description.		
[b] For examples, refer to B.1(d).		
[c] Refer to Table 20.5 for English and French abbreviation alternatives to the applicable designations.		

In Canada only:

Table 20.5
Abbreviations for the Label Designations

Designated term[a]	Abbreviation	
	English	French
Acknowledge	Ack	Acc
Activate	Act	Act
Alarm	Alm	Alme
Automatic	Auto	Autom
Building	Bldg	Bat
Bypass or Disable	Bypass or Dis	Dér or Désact
Circuit	Ckt	Cct
Emergency	Emg	Urg
Fault	Flt	Déf
Pre-announce	Pre-ann	Pré-ann
Releasing	Rel	Decl.
Signal	Signal	Sig
Silence	Sil	Neutr
Supervisory	Sup	Sup
System	Sys	Syst
Telephone	Tel	Tél
Timer	Tmr	Temp
Trouble	Tbl	Déf
[a] The individual designated term used in Table 20.4 may be abbreviated as indicated. The abbreviation is permitted to be applied to the entire label designation or portion of the label designation.		

20.2 Trouble signals

20.2.1 A trouble signal shall be indicated by:

a) In Canada only: A visual and audible signal.

b) In the United States only: A distinctive audible signal.

20.2.2 When an intermittent signal is used, it shall sound at least once every 10 s with a minimum on-time duration of 0.5 s.

20.2.3 When a common audible signal is to be employed, distinction shall be achieved visually.

20.2.4 In Canada only: A separate discrete indicator shall be provided for the common systems trouble signal.

20.2.5 In Canada only: A separate indication shall be provided for system ground fault indication.

NOTE: The system trouble and ground fault indicators are not required at remote equipment without an operator interface, such as booster power supplies and signal extenders.

20.2.6 A trouble signal may be common to several supervised circuits except where specific trouble indications are required in accordance with this Standard.

20.2.7 In Canada only: The audible trouble signal shall produce a sound level not less than 70 dBA at 1 m from the control unit with the door closed.

20.2.8 The activation of a self-restoring trouble signal and its restoration to normal shall be automatically indicated as described in 20.2.1 and 20.2.6. Deactivation of the trouble signal annunciation is acceptable for a trouble restoration signal.

20.2.9 The activation of a latching trouble signal shall be automatically indicated as described in 20.2.1 and 20.2.6.

20.2.10 Restoration of a latching trouble signal shall be indicated as described in 20.2.1 and 20.2.6 after activation of a manual reset.

20.2.11 The trouble signal annunciation of a fault condition shall occur within:

a) In Canada only: 90 s;

b) In the United States only: 200 s

20.2.12 An audible trouble signal that has been silenced shall be automatically reactivated every 24 h or less, and once reactivated, shall operate until it is manually silenced or acknowledged. The cycle shall continue until the trouble condition is corrected and the product is restored to the normal supervisory condition.

20.3 Supervisory signals

20.3.1 The signal indication resulting from the operation of a product for supervisory signals shall include distinctive audible and visual signals for both the activated state and the restoration-to-normal conditions of the supervisory initiating devices. Cancellation of the signal is acceptable annunciation for the restoration signal.

20.3.2 The product shall be capable of providing latching and non-latching supervisory signaling capability and the installation wiring diagram/instructions for the product shall include instructions for selecting the respective operation.

20.3.3 Supervisory signals shall be distinctive in sound from other signals used by the signaling system and this sound shall not be used for any other purpose other than to also indicate a system trouble condition. When the same sound is used for both supervisory and trouble signals, distinction between signals shall be indicated by a visible means and silencing of a trouble signal shall not prevent subsequent sounding of supervisory signals.

20.3.4 When an intermittent audible signal is used, it shall sound at least once every 10 s with a minimum on time duration of 0.5 s.

20.3.5 In Canada only: The audible supervisory signal shall produce a sound level not less than 70 dBA at 1 m from the control unit with the door closed.

20.3.6 Supervisory signal and actuation shall occur within 10 s of initiation of an activated state while the system is operating in its normal, quiescent state.

20.3.7 A coded supervisory signal shall consist of not less than two complete rounds of the number transmitted to indicate a supervisory off normal condition and not less than one complete round of the number transmitted to indicate restoration of the supervisory condition to normal.

20.3.8 A supervisory signal that has been silenced shall be automatically reactivated at the operator interface(s) every 24 h or less, and once reactivated, the audible and visual annunciation shall operate until it is manually silenced or acknowledged. The cycle shall continue until the supervisory is corrected and the product is restored to the normal supervisory condition.

20.4 Display

20.4.1 Systems shall be capable of simultaneously displaying all zones having a status change unless they include a sequential display in accordance with 20.5, Sequential Display.

20.5 Sequential display

20.5.1 Where a multiple-line sequential display is used, it shall comply with the following:

a) Separate lines shall be provided for each event;

b) Allow for a minimum of 28 characters for the description of each event location;

c) A visual indication showing deactivated (silenced) alarm notification appliances as required by 21.2.3, Trouble Silence;

d) In Canada only: Simultaneous display of a minimum of 8 input zones. For systems of less than 8 input zones, all zones shall be displayed;

Exception: Where a sequential display is used in conjunction with a display capable of displaying all alarm or supervisory input zones simultaneously, then 20.5.1(c) shall not apply but the rest of the requirements of this subsection shall apply.

e) An indication for each type (such as fire alarm, fire trouble, sprinkler supervisory) of active non-displayed status changes shall be continuously visible during all activated states;

f) When concurrent signals are received, they shall be indicated as follows in descending order of priority:

1) In Canada only: Refer to 24.3 for signal priority. For the purposes of this requirement, the summary display line may group the categories as follows:

i) Life Safety – fire alarm (1) and life safety emergency condition (2);

ii) Supervisory / Property – fire supervisory signal (3) and property and building safety (4);

iii) Trouble (5); and

iv) Other (6).

2) In the United States only:

i) Signals associated with life safety.

ii) Signals associated with property safety.

iii) Trouble signals associated with life and/or property safety.

iv) All other signals.

g) Prior to any manual operation, the display shall be as follows:

1) The display shall indicate the initial status change for the highest priority type signal.

2) In Canada only: Display format shall be: Event type, followed by event location or event sequence, followed by event type, followed by event location. When event sequence is indicated, events shall be sequentially numbered within each priority. Indication of time of event shall not be acceptable in lieu of sequential number(s).

h) The non-displayed status changes shall be capable of being displayed only by manual operation(s);

i) Provide a means to manually return to the first event in order of priority as indicated in Section 24, Signal Priority. This operation shall only affect its associated display;

j) The display control means, shall not interfere with the normal operation of the fire alarm system control unit; and

k) Screen saving feature, if applicable, shall be disabled during an alarm condition.

20.6 Annunciator

20.6.1 The annunciator functioning as an operator interface (separate from the control unit) shall comply with the following:

a) All control unit requirements;

Exception No. 1: System signals may provide required annunciation in whole or in part. Where controls are provided, associated annunciation is required.

Exception No. 2: Supplementary annunciators and keypads shall comply with the requirements in 20.7, Supplementary Display.

b) Interconnections to annunciators shall comply with the monitoring for integrity requirements of Section 23, Circuits;

c) A means shall be provided for testing visual indicators that are not supervised;

In the United States only:

Exception: A means may not be provided for testing visual indicators that are considered reliable in accordance with 54.5.1(c).

d) In Canada only: A system common trouble condition shall be indicated at the annunciator;

e) Where an audible trouble signal is provided, the annunciator shall provide a means to silence the local audible trouble signal while the visual indication remains “on” until the trouble condition has been corrected. The means to silence shall be self-restoring;

f) Visual display requirements of 20.4, Display;

g) In Canada only: A minimum of one annunciator or control unit shall have the capability to display all required trouble indications. These trouble indications need not be displayed simultaneously, except as required in Section 27, Voice Alarm Feature and Section 28, Emergency Telephone Feature.

20.6.2 When multiple circuits for keypads or annunciators are employed, the monitoring for integrity faults shall be applied independently to each circuit.

20.6.3 A computer workstation used as the annunciator shall comply with all the requirements of 20.6.1 if it is intended to be used as the only means of annunciation or if failure of the computer or its associated components, such as monitor, pointing, or storage device, inhibit the normal operation of the fire alarm system.

20.6.4 In Canada only: When a computer workstation is included in a fire alarm system and a separate control unit and annunciator provide all of the required display functions, then it shall comply with all the requirements of 20.6.1, except that an enclosure other than the computer enclosure itself is not required. In addition, the power supply and communication connection shall be attached to the product to prevent accidental removal Interconnecting wiring between a stationary computer and the computer's keyboard, video monitor, touch screen, or mouse pointing type device and are not required to be monitored for integrity providing:

a) Complete disconnection of the interconnecting cable is visually indicated so as to be obvious to the user or the disconnection does not affect the required system operation except for loss of the faulted function; and

b) The interconnecting cable(s) does not exceed 2.5 m.

20.6.5 In the United States only: When a computer workstation is included in a fire alarm system then it shall comply with all the requirements of 20.6.1. Interconnecting wiring between a stationary computer and the computer's keyboard, video monitor, touch screen, or mouse pointing type device are not required to be monitored for integrity providing:

a) Complete disconnection of the interconnecting cable is visually indicated so as to be obvious to the user or the disconnection does not affect the required system operation except for loss of the faulted function; and

b) The interconnecting cable(s) does not exceed 2.5 m.

20.6.6 In the United States only: Manual fire alarm activation at the keypad is permitted when:

a) The activation cannot occur inadvertently (such as by leaning up against the keypad or other similar action); and

b) The operation is not intended to be used in lieu of a manually-activated box.