

STANDARD INFORMATION

Standard: ULC S559

Standard ID: Standard for Equipment for Fire Signal Receiving Centres and Systems [CAN/ULC S559:2020 Ed.3]

Previous Standard ID: Standard for Equipment for Fire Signal Receiving Centres and Systems (R2018) [ULC S559:2013 Ed.2]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **October 22, 2023**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

Overview of Changes:

- Modifications to System Requirements
- Modifications to Communication Systems
- Modifications to Software-Controller Equipment
- Modifications to Instructions and Drawings
- Modifications to Construction
- Modifications to Marking
- Modifications to Performance Tests

Specific details of new/revised requirements are found in table below.

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<i>Additions to existing requirements are <u>underlined</u> and deletions are shown lined-out below.</i>
6	Info	Emergency Power Supply <i>New clause added;</i> Where an electronic uninterruptible power supply (UPS) is used as an emergency power supply, the following requirements shall apply: a) The UPS shall meet the requirements of CSA-C22.2 No. 107.3, Uninterruptible Power Systems, and the applicable requirements of this Standard; b) The UPS shall have capacity to maintain fire signal receiving and transmitting equipment operation in accordance with 6.9; c) The UPS system shall provide a trouble signal to the fire signal receiving and transmitting equipment indicating the following abnormal conditions; 1) UPS switches from the primary power source to the secondary power source; and 2) UPS trouble. 6.8 d) The input and output of a UPS system shall have a means for permanent connections except where the UPS system and the connections are provided in a lockable enclosure. The permanent connections shall be in accordance with CSA-C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Section 32; e) The installation instructions shall specify that in order to perform maintenance and repair service, a means for disconnecting the UPS while maintaining continuity of power to the fire signal receiving and transmitting equipment, when applicable, shall be provided; f) The off-normal position of the UPS disconnecting means as described in (e) shall result in a nonlatching supervisory signal or trouble signal at the fire signal receiving and transmitting equipment; and g) The installation instructions shall specify that the UPS shall be installed in accordance with CSAC22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Section 46 – Emergency Power Supply, Unit Equipment, Exit Signs, and Life Safety Systems. <i>New clause added;</i>
6.9		When batteries or uninterruptible power supplies (UPS) are used for emergency power supply, they shall be sized to meet the following requirements as well as Section 44, Battery Tests:



CLAUSE	VERDICT	COMMENT
		a) Twenty-four hours of standby power plus the rated alarm load if the product is not intended for use with an engine-driven generator in accordance with 5.3; or b) 30 mins of standby power plus the rated alarm load if emergency power supply is intended for use with an engine-driven generator.
10	Info	Visual Displays, Controls and Recording Devices
		Printers, displays, control functions of the receiver etc. may be provided by, and/or operated from, external SRCAS, <u>that shall comply with the requirements of CAN/ULC-S1981, Standard for Signal Receiving Centre Automation System,</u> provided:
10.5		a) A fault does not impair normal operation of the fire signal receiving centre equipment; b) The communication between signal receiving equipment and SRCAS shall be supervised; and c) Upon the failure of the SRCAS the required functions of the receivers connected to the SRCAS (which may be suppressed) shall revert to their normal operation as required in 10.3.
		<u>Exception: Fire signal receiving centre receivers intended to be used in conjunction with Hot Redundant SRCAS in compliance with CAN/ULC-S561, Standard for Installation and Services for Fire Signal Receiving Centres and Systems, do not require to comply with (c).</u>
	Info	COMMUNICATION SYSTEMS
12	Info	General
12.12		A communication channel using public access packet switched data networks shall detect the introduction into the communication channel of digital information that has been previously exchanged between the protected premises and the fire signal receiving centre. Such a compromise attempt shall be automatically detected and indicated within 180 s at the signal centre equipment. For testing purposes, a device that has been programmed accordingly shall be used to capture and analyze the digital data that is being transmitted in order to produce a signal which simulates the original transmitted data signal. <u>utilize encryption algorithms with a minimum of 128 bits of security strength to provide data protection against a compromise attempt.</u>
		<i>New clause added;</i>
12.13		Evidence of compliance for the validation of encryption algorithms (for example, Federal Information Processing Standards (FIPS), Specification for the Advanced Encryption Standard, FIPS 197) or validation of security requirements for cryptographic modules (for example, FIPS 140-2, “Security Requirements for Cryptographic Modules”) with the National Institute of Standards and Technology (NIST) shall be provided.



CLAUSE	VERDICT	COMMENT
14	Info	Active Communication Systems <i>New clause added;</i> Active communication path(s) shall be monitored for integrity in accordance with the following: a) Where only one communications path is used, the following requirement shall be met: 1) Any failure of the communications path shall be annunciated at the supervising station within 180 s of a fault that affects the communication between the transmitter at the protected premise and the receiver at the signal receiving center. b) Where two or more non-interdependent communication paths are used, the requirements of all the following shall be met: 1) Each communications path shall be monitored for integrity; 2) The designated primary path shall be monitored such that any failure of the communications path shall be annunciated at the supervising station within 180 s of a fault that affects the communication between the transmitter at the protected premise and the receiver at the supervising station; 3) Failure of the secondary communications path while the designated primary path is functional shall be annunciated at the signal receiving center within not more than 24 h of the failure; and 4) Upon failure of the designated primary path, the secondary communication path shall be monitored such that any failure of the secondary communications path shall be annunciated at the supervising station within 180 s of a fault that affects the communication between the transmitter at the protected premise and the receiver at the supervising station.
15	Info	Passive Communication Systems
15.6		Each MFVN and/or PSTN communication channel shall be tested for functionality at intervals not exceeding 6 h. Other passive communication systems shall be tested at intervals not exceeding 24 h.
	Info	SOFTWARE-CONTROLLED EQUIPMENT
16	Info	General <i>New clauses added;</i>
16.3-16.9		These clauses contain information for software-controlled equipment. See standard for details. <i>New section added;</i>
17		Firmware The execution of the firmware shall be monitored. See standard for details.



CLAUSE	VERDICT	COMMENT
		<i>New section added;</i>
18		Software Integrity The software design shall cause the product to operate as intended and shall not contain known critical defects. See standard for details.
		<i>New section added;</i>
19		User Access Levels All software and firmware shall be protected from unauthorized changes. See standard for details.
	Info	INSTRUCTIONS AND DRAWINGS
20	Info	General
		<i>New clause added;</i>
20.1		Each product (other than an end-of-line device) shall be furnished with installation instructions and wiring drawings. The information shall be attached to the unit or, when separate, shall be referenced in the marking attached to the unit by the name or trademark of the manufacturer, drawing number, and issue date and/or revision level. When separate, a copy shall be supplied with each individual product or with each single shipment when multiples of the same product are shipped directly to an end customer in a single shipment.
		<i>New clause added;</i>
20.2		The information referenced in 20.1 and containing the details required in 20.4 – 20.9 shall be made available by one or more of the following means: a) Marking attached to the product; b) Separate printed instructions; c) Electronic instructions within the basic product software; and d) Electronic media such as CD-ROM, thumb drive, website, etc. or equivalent.
		<i>New clause added;</i>
20.3		When the installation information is provided as described in 20.2 (b), (c), and/or (d), it shall be referenced in the product marking by: a) Name of trademark of manufacturer; b) Drawing number and/or the equivalent identification; and c) Issue date, revision level, and/or release date.



CLAUSE	VERDICT	COMMENT
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New clause added;

Where the field-programmable software of a product contains both complying as well as noncomplying features or parameters as permitted in 16.8, the following (or equivalent presentation) shall be included in the front of the programming manual or the beginning of the program section of the installation manual:

20.9

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION,
AND OTHER INVOLVED PARTIES

This product incorporates field-programmable software. In order for the product to comply with the requirements in CAN/ULC-S559, Standard for Control Units for Fire Alarm Systems, certain programming features or options must be limited to specific values or not used at all as indicated below.

Program feature or option

Permitted in CAN/ULC-S559 (Y/N)

Possible settings

Settings permitted in CAN/ULC-S559

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Info

Product Assembly

Products that currently meet the requirements of CAN/CSA-C22.2 No. 60950-1, Information Technology Equipment Safety Part 1: General Requirements or CAN/CSA C22.2 No. 60065, Audio, Video, and Similar Electronic Apparatus – Safety Requirements, or UL 62368-1, Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements, need only to be evaluated to the following with respect to the construction requirements:

21.3

- a) 23.1.1, Enclosing of electrical parts;
- b) 23.1.5, Provision for installation wiring entry by means of conduit;
- c) 25.1, Field Wiring Connections – General;
- d) 25.2.1, Sufficient size of field wiring compartment;
- e) 25.2.3, Access to field wiring connections;
- f) 25.2.5, Protection of field wiring connections;
- g) 25.3, Field Wiring Leads;
- h) 27.6, Transformers, Relays;
- i) 27.7.2, Monitoring of capacitors;
- j) 27.8, Storage Batteries;
- k) 27.9.2, Protective Devices – replaceable or resettable;
- l) 27.10, Overcurrent Protection;
- m) Section 29, End-of-Line Devices; and
- n) Section 36, Operating Controls.



CLAUSE	VERDICT	COMMENT
36	Info	Operating Controls <i>New clause added;</i>
36.1		The manual controls on a product intended for use in an unsecured (public) area shall be physically protected and secured against operation by unauthorized personnel. An alarm silencing control, a trouble silencing control, and a reset control are examples of operating controls.
	Info	MARKING
37	Info	General
37.4		Abbreviations and symbols shall be in accordance with ANSI/IEEE Y32.9, Standard for Graphic Symbols for Electrical Wiring and Layout Diagrams Used in Architecture and Building Construction <u>and the standards of ISO Technical Committee 145, Graphical Symbols.</u> <i>New clause added;</i>
37.5		All non-caution and non-warning label designations, including French equivalents of English markings, shall be provided in accordance with, or equivalent to, Table 11.1, Label Designations, and Table 11.2, Abbreviations for the Label Designations, as applicable. <i>New clause added;</i>
37.6		All caution and warning label designations shall be provided in both English and French languages in accordance with Table 37.1, Cautions and Warnings, as applicable. <i>New clause added;</i>
37.7		Symbols used in lieu of, or in combination with, label designation text in 37.5 and 37.6 to meet equivalent Table 11.1 and Table 11.2 requirements shall be in accordance with 37.4.
38	Info	Identification and Rating
38.1		Unless stated otherwise the following required marking may be on the outside or the inside of the product as appropriate: g) Identification of indicators, controls, meters, meter connection points, installation wiring terminals, and the like, shall be located adjacent to the component and be clearly marked for intended function in accordance with, or equivalent to, Table 11.1, <u>Label Designations, and Table 11.2, Abbreviations for Label Designations, where applicable. Symbols used in lieu of, or in combination with, label designation text to meet equivalent Table 11.1 and Table 11.2 requirements shall be in accordance with 37.4;</u> <i>New clause added;</i>
38.2		In accordance with 16.9, indication of compatible software employed in compatible products, by part number and revision level shall be specified.



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
		A product tested using the manufacturer's instructions for voltage adjustment as indicated in the Exception to 46.6 shall be provided with a marking, as follows:
38.3		a) Adjacent to the cord or supply compartment, to warn the user that internal adjustments must be made when the product is installed or moved; and b) Showing the adjustments that must be made for various voltages.
		The marking shall either be on the outside or inside of the overall enclosure of the product where visible at the points of adjustment.
	Info	PERFORMANCE TESTS
40	Info	General
		<i>New clause added;</i>
		Products that meet the requirements of CAN/CSA-C22.2 No. 60950-1; or CAN/CSA C22.2 No. 60065, Audio, Video, and Similar Electronic Apparatus-Safety Requirements, or UL 62368-1, Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements are not required to be evaluated to the following:
40.9		a) Section 47, Dielectric Voltage-Withstand Test; b) Section 48, Electric Shock Current Test; c) Section 56, Evaluation of Conformal Coatings on Printed Wiring Boards; d) Section 57, Tests on Special Terminal Assemblies; e) 59.2, Abnormal Operation Tests – Operation; f) 59.4, Abnormal Operation Tests – Electronic Components; g) 59.6, Abnormal Operation Tests – Transformer Power Supply Burnout; h) 59.7, Abnormal Operation Tests – Communication Circuits Out; i) Section 60, Mechanical Strength Tests for Enclosures; j) Section 61, Flame Test for Polymeric Materials; k) Section 62, Ignition Test Through Bottom-Panel Openings; l) Section 64, Permanence of Marking; and m) Section 65, Leakage Current Test.
		<i>New section added;</i>
46		Component Temperature Rise
		A product, when operated under any normal condition of intended use and at maximum rated load, shall not reach a temperature at any point high enough to: See standard for details.



CLAUSE	VERDICT	COMMENT
53	Info	Transient Test
53.2	Info	Externally-induced supply-line transients <i>New clause added;</i>
53.2.2		For this test, the product is to be connected to a transient generator capable of producing Location Category A 100 kHz Ring Wave transients as defined in Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits, ANSI/IEEE C62.41.
53.2.3		The product is to be subjected to 500 transient pulses induced at an average rate of <u>3 6</u> pulses every minute. A total of 250 pulses are to be applied so that the transient is induced <u>90 degrees</u> into the positive phase with reference to earth ground of the <u>60 Hz cycle</u> , and the remaining 250 pulses are to be induced <u>90 degrees</u> into the negative phase with reference to earth ground of the <u>60 Hz cycle</u> . Of the total 250 pulses at each polarity, 225 are to be applied with the product in the normal supervisory condition and 25 are to be applied with the product in the alarm condition.
54	Info	Electrostatic Discharge Test
54.2		A product is to be mounted in its intended mounting position on a 19 mm thick unpainted exterior grade plywood surface and connected to a source of supply in accordance with Section 40, General. The enclosure is to be connected to earth ground, <u>as described in the installation instructions for the product. When a product under test is intended to be installed in a metal electrical junction box, the junction box is to be connected to earth ground. An electrostatic discharge simulator with a capacitive resistive network of 250 pF and 1.5 KΩ is to be charged to 10 000 V for a minimum of 2 s before each discharge. The tip of the probe used to contact the unit under test is to be spherical in shape, either half or full, and 12.7 mm ±1.0 mm (0.5 inch ±0.04 inch) in diameter.</u>
55	Info	Radio Frequency Interference Test <i>New clause added;</i>
55.1		Products that require the opening of a door to gain access to the operating controls and display shall be tested with the door(s) in an open position. Products utilizing a microprocessor shall be subjected to the testing described in 55.1.2 through 55.1.4.
55.1.2		When subjected to the tests described in 55.1.4, and while energized from a source of supply in accordance with 40.4, a product shall: <u>c) Not interrupt the execution of non-supplementary program operation;</u>
55.1.3		To determine compliance with 55.1.2, the product is to be energized from a source of rated voltage and frequency, interconnected as described in the installation wiring diagram/instructions, and subjected to the radio-frequency interference described in 55.1.4 <u>when the test method is based upon the power output from the antenna or 55.2 and 55.3 when the test method is based upon the field strength measured at the product under test.</u>



CLAUSE	VERDICT	COMMENT
55.2	Info	Power output from the antenna <i>New clause added;</i>
55.2.1		The forward power to the antenna shall be compensated by the measured reflective power and the calibrated gain of the antenna to produce the minimum output power level specified in Table 55.1, Radio Frequency Interference Levels for each frequency.
55.3		Field strength
55.3.1		The forward power with carrier only modulation, required to produce the field strength at a given point in a room as measured by a field probe shall be recorded without the product under test in the room. The product under test shall replace the field probe in the room and the amount of power needed to produce the required field strength shall be put into the antenna to produce the minimum field at the product under test. Amplifiers employed to produce the forward power shall not be in saturation when the required AM or FM modulation is utilized. <i>New section added;</i>
58		Strain Relief Test When tested in accordance with 58.1.2, the strain-relief means provided on the flexible cord shall be capable of withstanding for 1 min without displacement or damage to the wire insulation. See standard for details.
59	Info	Abnormal Operation Tests
59.4	Info	Electronic components <i>New clause added;</i>
59.4.4		Three tests of each combination, using untested components for each test, shall be conducted. Exception: If analysis of the test results and circuit indicate that the result obtained is the only one likely to occur, the test need be conducted only once. <i>New clause added;</i>
59.4.5		When the circuit is interrupted by opening of a component, the test is to be repeated twice, using new components when required. When a printed wiring board trace opens, the gap is to be electrically shorted and the test continued until ultimate results occur, and the procedure is to be repeated for each occurrence of a trace opening. Exception: After opening of an internal overcurrent protective device, the test is not required to be repeated.



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
59.4.6		<p>The test of 59.4.3 is to be continued for 1 hour or until one of the following conditions occurs:</p> <ul style="list-style-type: none">a) Ignition or charring of the cheesecloth indicator (charring is deemed to have occurred when the structural integrity of the threads has been destroyed due to the temperature rise); orb) Fuse from the enclosure to ground does opens. <p>When, at the end of 1 hour, no condition described below has occurred, and it is indicated that such a condition is imminent, the test is to be continued until ultimate results are obtained (usually 7 hours).</p>
		<i>New clause added;</i>
59.4.7		<p>Immediately following each fault described in 59.4.3, within one minute of the conclusion of the test, the product shall be subjected to the Dielectric Voltage-Withstand Test, Section 47.</p>
		<i>New section added;</i>
59.8		<p>Evaluation of reduced spacings on printed-wiring boards</p> <p>In accordance with the Exception of 35.1, printed-wiring board traces of different potential having reduced spacings shall comply with: See standard for details.</p>