

STANDARD INFORMATION

Standard Number: UL 985

Standard Name: Household Fire Warning System Units

Standard Edition and Issue Date: 6th Edition Dated May 15, 2015

Date of Revision: May 15, 2015, September 5, 2017, and July 12, 2018

Date of Previous Revision of Standard: 5th Edition Revised October 31, 2008

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **June 10, 2020**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: A review of all Listing Reports is necessary to determine which products comply with new/revise requirements and which products will require re-evaluation. **NOTE:** Effective immediately, this revised standard will be exclusively used for evaluation of new products unless the Applicant requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revise requirements.

Overview of Changes:

May 15, 2015:

- Requirements added that stipulate security functions meet UL 1023
- Requirements added for two independent power sources
- Requirements added for turning off activated alarm notifications
- New requirements when manual activations at keypads can trigger a fire alarm condition
- New requirements for specific monitoring and operation requirements for off-premise internet signaling

September 5, 2017:

- The September 5, 2017 revision is admin in nature and no requirements have been changed

July 12, 2018:

- Alarm Verification Labeling
- Revision to Charging Current Test

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

If the applicable requirements noted in the table are not described in your report(s), these requirements will need to be confirmed as met and added to your report(s) such as markings, instructions, test results, etc. (as required).



Client Action Required:

Information – To assist our Engineer with review of your Listing Reports, please submit technical information in response to the new/revised paragraphs noted in the attached or explain why these new/revised requirements do not apply to your product (s).

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 – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records.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
<p>Additions to existing requirements are <u>underlined</u> and deletions are shown lined out below.</p>		
<p>The follow changes reflect the May 15, 2015 revision</p>		
1	Info	<p>Scope</p> <p><i>New clause added;</i></p>
1.7		<p>Where a unit employs security functions, it shall comply with the Standard for Household Burglar-Alarm System Units, UL 1023. Units employing medical alert functions shall comply with the Standard for Home-Health Care Signaling Equipment, UL 1637. A unit utilizing non-fire and/or non-carbon monoxide emergency and/or non-emergency signaling functions shall meet the requirements of the Standard for General-Purpose Signaling Devices and Systems, UL 2017.</p>
19		<p><i>New section added;</i></p> <p>Power Connections</p>
19.1		<p>Household fire warning systems shall have two independent power sources consisting of a primary source that uses commercial light and power and a secondary source that consists of a rechargeable battery.</p>
19.2		<p>A primary battery is not prohibited from being used as the sole source of power for a low-power wireless transmitter when the conditions of 64.8 are met.</p>
41	Info	<p>Normal Operation Test</p>
41.1	Info	<p>Fire alarm control unit</p>



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
41.1.7		Audible alarms utilizing a low-frequency tone shall comply with the fundamental and harmonic frequency requirements in the section for Determination of low frequency signal format in the Standard for Audible Signal Appliances, UL 464.
		<i>New clause added;</i>
		A voice message shall be permitted to be included with the standardized alarm signal in one or both of the formats noted below:
41.1.8		a) A voice message of 1.5 seconds or less in length shall be permitted to be inserted into any or all of the 1.5 second off phases of the temporal pattern. b) A voice message that exceeds 1.5 seconds but does not exceed 10 seconds in length shall be permitted to be inserted following a minimum of 8 cycles of the initial “three pulse” temporal pattern. This voice message shall be followed by not less than 2 cycles of the “three pulse” temporal pattern. The voice message shall then be permitted to be repeatedly inserted provided that each additional use of the voice message follows at least 2 cycles of the “three pulse” temporal pattern.
		<i>New clause added;</i>
41.1.9		Visible alarm notification appliances shall comply with the requirements of the Standard for Signaling Devices for the Hearing Impaired, UL 1971.
		<i>New clause added;</i>
		Any manual means for turning off activated alarm notification appliances (silencing) shall comply with the following requirements:
41.1.14		a) Alarm signal deactivating of activated notification appliances of a control unit/system shall be indicated by a constantly displayed and identified visual indicator; b) An alarm signal deactivating means left in the off-normal condition when there is no alarm shall activate an audible trouble signal until the means is restored to normal; c) An alarm-signal deactivation switch shall be either: 1) A key-lock type, with the key removable only in the normal position; 2) Located inside of a locked enclosure; 3) Access limited by a software security code providing a minimum of 1000 combinations and with a maximum 30-minute time-out feature after the last activity; or 4) Arranged to provide equivalent protection against unauthorized use. d) The activation of the alarm signal deactivating means during an alarm condition shall not result in resetting any actuated circuit other than the notification appliance circuit(s) or zone(s) being deactivated; and e) The alarm condition shall be indicated and maintained by a lamp or other visual indicator with the deactivating means activated.



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
41.1.15		Fire alarm activation at a keypad shall require a manual operation of a minimum of two simultaneous or sequential operations.
		<i>New clause added;</i>
41.1.16		Actuation of a sprinkler waterflow alarm initiating device shall be permitted to activate an alarm signal.
		<i>New clause added;</i>
41.1.17		Actuation of a sprinkler waterflow supervisory initiating device, such as a valve tamper switch, shall activate a supervisory signal.
41.2	Info	Supervising stations
		<i>New clause added;</i>
		Communications path(s) other than those described in 41.2.2, such as internet signaling shall comply with the following:
41.2.3		<p>a) Any failure of the communications path shall be annunciated at the supervising station and at the user interface at the protected premise within 7 days of a fault that affects the communication between the transmitter at the protected premise and the receiver at the supervising station .</p> <p>b) Failure to complete a signal transmission from the transmitter at the protected premise to the receiver at the supervising station shall result in a trouble annunciation at the user interface at the protected premise.</p> <p>c) Alarm, trouble, and supervisory signals, and their restoration to normal, transmitted from the protected premise shall be received, displayed, and recorded at the supervising station in not greater than 90 seconds from the time they are transmitted from the protected premise.</p> <p>d) Where a transmitter shares a transmission or communications channel with other transmitters; each transmitter shall have a unique identifier.</p> <p>e) Communication of alarm, supervisory, and trouble signals shall prevent degradation of the signal in transit by means of one of the following:</p> <ol style="list-style-type: none"> 1) Signal repetition: Multiple transmissions repeating the same signal; 2) Parity check: A mathematical check sum algorithm of a digital message that verifies correlation between transmitted and received message; or 3) A means that provides a certainty of 99.99 percent that the received message is identical to the transmitted message. <p>f) The installation instructions for the transmitter shall alert the user that all equipment necessary for the transmission of alarm, trouble, supervisory and other signals located at the residence shall have a secondary power capacity of 24 hours.</p>



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
41.2.4		The time period for the minimum required test signals specified in 41.2.2(c) and 41.2.3(a), as applicable, shall be the default programming setting for the transmitter and the test signals shall be automatically implemented when signaling to a supervising station is utilized.
41.3	Info	Combination control unit
		In a combination control unit, such as a combination household fire-burglar alarm control unit, the following operation shall be obtained: a) A fire alarm signal shall take precedence or be clearly recognizable over any other signal even when the nonfire-alarm signal is initiated first. b) Distinctive alarm signals shall be obtained between fire alarm and other functions, such as burglar alarm. The use of a common sounding appliance for fire and burglar alarm complies with this requirement if distinctive signals are obtained.
41.3.1.1		<u>Exception: The audible emergency evacuation signal shall be permitted to be used for other devices as long as the desired response is immediate evacuation.</u> c) The following priority of signaling shall be maintained: 1) <u>Fire alarms;</u> 2) <u>Carbon monoxide alarms and medical alarms;</u> 3) <u>Sprinkler supervisory;</u> 4) <u>Security alarms;</u> 5) <u>Fire and carbon monoxide Trouble Signals;</u> <u>Other signals.</u>
		<i>New clause added;</i>
41.3.1.2		When a fire alarm system is intended to share components, equipment, circuitry, or installation wiring with non-fire equipment, the requirements of 41.3.2.1 – 41.3.2.4 shall apply.
		<i>New clause added;</i>
41.3.1.3		Short circuit or open circuit single faults in the non-fire equipment or in the wiring between the non-fire equipment and the fire alarm system shall not impede or impair the monitoring for integrity of the fire alarm system, nor impede or impair any fire alarm signal transmissions or operations.
		<i>New clause added;</i>
41.3.1.4		Single ground faults which impede or impair the monitoring for integrity of the fire alarm system, or impede or impair any fire supervisory or trouble signal transmissions or operation shall be reported at the household fire alarm system user interface per the requirements of 44.2 whether they occur in the fire alarm equipment, non-fire alarm equipment, or wiring.



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
41.3.1.5		Single ground faults in the non-fire alarm equipment shall not impair the alarm operation of the fire alarm system.
		<i>New clause added;</i>
41.3.1.6		The required operation of the fire alarm equipment shall not be impaired by any failure of the non-fire alarm equipment hardware, software or circuits, or by any maintenance procedure, including removal or replacement of defective equipment or powering down of the non-fire equipment.
		<i>New section added;</i>
		Carbon monoxide signalling
41.3.2		This section contains requirements to be consistent with the 2019 Edition of the National Fire Alarm and Signaling Code [NFPA 72] Chapter 29 Single- and Multiple-Station Alarms and Household Signaling Systems with respect to household carbon monoxide detection systems (see standard for details).
44	Info	Electrical Supervision Test
44.1	Info	Power supplies
		<i>New clause added;</i>
44.1.3		Provision shall be made for an automatic test of the standby battery at least once every 4 hours. The test shall be conducted under a load sufficient to determine if the battery requires service, has been removed, or is disconnected. A battery requiring service is defined as a battery which is not capable of providing 4 minutes of alarm signaling during a power failure. If the automatic battery test determines that the battery requires service or is disconnected, a distinctive audible and visual trouble signal shall be provided at the user interface.
44.2	Info	Interconnecting circuits and pathways
44.2.1		Household fire alarm system smoke detectors, initiating devices and notification appliances shall be <u>monitored for integrity so that within 200 s</u> a distinctive audible trouble signal will indicate the occurrence of a single break (open) or single ground fault in the interconnections, which would prevent the intended operation of the interconnected devices. Prior to the application of a fault the control unit shall be energized in the intended standby condition while connected to a rated source of voltage and frequency.
44.3	Info	Trouble signals



CLAUSE	VERDICT	COMMENT
44.3.2		<p>A trouble signal shall be distinctive from all alarm signals. In a combination system, both fire alarm and nonfire alarm circuits are not prohibited from using the same trouble signal. <u>Where an intermittent signal is used, it shall sound at least once every ten seconds with minimum on-time duration of one-half second. When a common audible signal (distinct from alarm) is to be employed for trouble annunciation for both fire and non-fire related signals, distinction shall be achieved visually.</u></p>
44.3.4		<p>If a silencing means, such as a switch, is provided to de-energize the audible trouble signal, its off-normal position shall be indicated by a trouble light.</p> <p><u>A means for silencing a trouble sounding device shall comply with all of the following:</u></p> <p>a) <u>Limiting access by being one of the below:</u></p> <ol style="list-style-type: none"> <u>1) Key operated with the key removable only in the normal position;</u> <u>2) Located within a locked cabinet;</u> <u>3) Limited by a software security code providing a minimum of 1000 combinations and with a maximum 30-minute time-out feature after the last activity; or</u> <u>4) Arranged to provide equivalent protection against unauthorized use.</u> <p>b) <u>A visible trouble indicator remains activated or is simultaneously activated when the sounding device is de-energized.</u></p> <p>c) <u>The audible trouble signal shall sound when the means is in the "silence" position and no trouble exists.</u></p> <p>d) <u>The visible indicator shall be located and identified so that the user will recognize the signal as soon as it is activated.</u></p>
44.4		<p><i>New section added;</i></p> <p>Keypads</p>
44.4.1		<p>Keypads and other operator interfaces shall be monitored for integrity so that within 200 seconds a distinctive audible trouble signal will indicate the occurrence of a single break (open) or single ground fault in the interconnections, which would prevent the intended operation of the system for alarms, alarm transmissions to a supervising station, or the signal representative of a failure to complete a signal transmission with a supervising station. The trouble annunciation shall be at an operator interface or audible at the operator interface. Prior to the application of a fault the control unit shall be energized in the intended standby condition while connected to a rated source of voltage and frequency.</p> <p>Exception: Supervision is not required for keypad interconnections to the control unit extending not more than 3 feet (0.91 m) from the control unit.</p>
51	Info	Charging Current Test
51.2	Info	Discharged battery



CLAUSE	VERDICT	COMMENT																					
		At the conclusion of the discharge period, maximum (alarm) load is to be applied for 4 minutes. The battery terminal voltage of the discharge battery and the voltage of all output circuits is then to be measured.																					
51.2.4		<u>Exception: Where a combination system includes carbon monoxide signaling, after the 4 minutes of fire or carbon monoxide alarm, the maximum carbon monoxide alarm load shall continue to be applied for a period of not be less than 12 hours, followed by 7 consecutive days of trouble (audible and visual) signals. The 5-second "off" time of the carbon monoxide alarm signal shall be permitted to be changed to 60 seconds plus or minus 10 percent.</u>																					
58	Info	Transient Test																					
58.4	Info	Dielectric Voltage-Withstand Test																					
58.4.2		For this test, each input/output circuit is to be subjected to five different transient waveforms having peak voltage levels in the range of 100 to 2400 volts, as delivered into a 200-ohm load. A transient waveform at 2400 volts is to have a pulse rise time of 100 volts per microsecond, a pulse duration of approximately 80 microseconds, and an energy level of approximately 1.2 joules. Other applied transients are to have peak voltages representative of the entire range of 100 to 2400 volts, with pulse durations from 80 to 110 microseconds, and energy levels not less than 0.3 joule or greater than 1.2 joules. <u>each output circuit is to be subjected to the transient waveforms specified in the following table, as delivered into a 200-ohm load. The transient pulses are to be coupled directly onto the output circuit conductors of the equipment under test.</u>																					
New table added;																							
Transient waveforms																							
Table 58.1	<table border="1"> <thead> <tr> <th>Peak voltage level, V</th> <th>Minimum energy level, J</th> <th>Minimum pulse duration, μs</th> <th>Figure No.</th> </tr> </thead> <tbody> <tr> <td>2400</td> <td>1.0</td> <td>80</td> <td>58.1</td> </tr> <tr> <td>1000^a</td> <td>0.31</td> <td>150</td> <td>58.2</td> </tr> <tr> <td>500^a</td> <td>0.10</td> <td>250</td> <td>58.3</td> </tr> <tr> <td>100</td> <td>0.011</td> <td>1120</td> <td>58.4</td> </tr> </tbody> </table>			Peak voltage level, V	Minimum energy level, J	Minimum pulse duration, μ s	Figure No.	2400	1.0	80	58.1	1000 ^a	0.31	150	58.2	500 ^a	0.10	250	58.3	100	0.011	1120	58.4
	Peak voltage level, V	Minimum energy level, J	Minimum pulse duration, μ s	Figure No.																			
	2400	1.0	80	58.1																			
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	500 ^a	0.10	250	58.3																			
100	0.011	1120	58.4																				
^a Other applied transients having peak voltages representative of the entire range of 100 – 2400 volts shall be used in lieu of these values when the output circuit is only designed specifically to protect against these predetermined values. The transients shall meet or exceed the specified minimum pulse duration (Figure 58.5) and minimum energy level (Figure 58.6) parameters, and shall have an equal or faster minimum transient pulse rise time than that specified in Figure 58.7.																							
61	Info	Audibility Test																					
61.2		The sound power output of the alarm sounding appliance shall be measured in a reverberant room qualified for pure tones under Precision Methods for the Determination of Sound Power Levels of Broad-Band Noise Sources in Reverberation Rooms, ANSI/ASA S12.31-1990, or Precision Methods for the Determination of Sound Power Levels of Discrete-Frequency and Narrow-Band Noise Sources in Reverberation Rooms, ANSI/ASA S12.32-1990. of ISO 3741, <u>Acoustics Determination of Sound Power Levels of Noise Sources Using Sound Pressure Precision Method for Reverberation Rooms – Technical Corrigendum 1.</u>																					



CLAUSE	VERDICT	COMMENT
		The sound power in each one-third octave band shall be determined using the comparison method. The A-weighting factor shall be added to each one-third octave band. The total power shall then be determined on the basis of actual power. The total power shall then be converted to an equivalent sound pressure level for a radius of 10 feet (3.05 m) using the following formula:
	Info	MARKINGS
81	Info	General
		<i>New clause added;</i>
81.6		All markings shall be permanent. Markings affixed to the outside of a product or cautionary and located on the inside of a product are a shall be sufficiently durable to resist the effects of handling, cleaning agents, and the like, anticipated in the intended use. See 81.8.
		<i>New clause added;</i>
81.8		A marking affixed to the outside of a product or cautionary and located on the inside of a product which is secured by cement or adhesive shall comply with the applicable portions of the requirements in the Standard for Marking and Labeling Systems, UL 969.
The following changes reflect the July 12, 2018 revision		
51	Info	Charging Current Test
51.2	Info	Discharged battery
		At the conclusion of the discharge period, the loads <u>indicated in 51.2.5 – 51.2.6</u> are to be applied. The battery terminal voltage of the discharge battery and the voltage of all output circuits are then to be measured.
51.2.4		Exception: Where a combination system includes carbon monoxide signaling, after the 4 minutes of fire or carbon monoxide alarm, the maximum carbon monoxide alarm load shall continue to be applied for a period of not be less than 12 hours. The 5-second "off" time of the carbon monoxide alarm signal shall be permitted to be changed to 60 seconds plus or minus 10 percent.
		<i>New clause added;</i>
51.2.5		The maximum alarm load is to be applied for 4 minutes for fire alarm conditions.
		<i>New clause added;</i>
51.2.6		Where a combination system includes carbon monoxide signaling, the following load(s) are to be applied, as applicable to achieve minimum 12 hours of carbon monoxide audible alarm:



CLAUSE	VERDICT	COMMENT
		<p>a) The product is to be placed in a carbon monoxide alarm condition and the maximum carbon monoxide alarm load is to be applied for 12 hours when the secondary power source (battery) of the product supplies power for the carbon monoxide audible alarm signal specified in 41.3.2.1;</p> <p>b) The product is to be placed in a carbon monoxide alarm condition and the maximum carbon monoxide alarm load is to be applied for 4 minutes when all of the following conditions are met:</p> <ol style="list-style-type: none"> 1) the secondary power source (battery) of the product does not supply power for the carbon monoxide audible alarm signal(s) specified in 41.3.2; 2) the interconnected product(s) employing the audible device(s) signaling the carbon monoxide audible alarm signal specified in 41.3.2.1 individually meet the 24 hour normal standby period followed by the 12 hour alarm period requirements; and 3) the carbon monoxide audible alarm signal specified in 41.3.2.1 is maintained for the 12 hour period independent of the control panel (product) maintaining secondary power after the standby period specified in 51.2.3.
	Info	INSTRUCTIONS
80	Info	General
		<p>Each household control unit shall be provided with the following operating, installation, and maintenance instructions in printed form.</p> <p>b) Description of the operation, testing, and maintenance procedures of the system. This shall include an indication of the following conditions, where applicable:</p> <p>13) The following information shall be included:</p> <p style="text-align: center;">"WARNING"</p> <p>"THIS UNIT INCLUDES AN ALARM VERIFICATION FEATURE THAT WILL RESULT IN A DELAY OF THE SYSTEM ALARM SIGNAL FROM THE INDICATED CIRCUITS. THE TOTAL DELAY (CONTROL UNIT PLUS SMOKE DETECTORS) SHALL NOT EXCEED 60 SECONDS. NO OTHER SMOKE DETECTOR SHALL BE CONNECTED TO THESE CIRCUITS UNLESS APPROVED BY THE LOCAL AUTHORITY HAVING JURISDICTION."</p>
80.1		
<p>CUSTOMERS PLEASE NOTE: This Table and column "Verdict" can be used in determining how your current or future production is or will be in compliance with new/revised requirements.</p>		