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Mass Notification Systems UL2572

Derek Mathews / Senior Staff Engineer

Various tragic events over the last several years have made it apparent that occurrences other than fire related incidents can cause loss of life. Tragedies such as the September 11th attacks and shootings at Virginia Tech University,

Northern Illinois University and Sandy Hook Elementary School in Connecticut demonstrate the need for action.

The Mass Notification System (MNS) concept was first developed by the U.S. military with the publication of UFC 4-021-01 Design and O&M: Mass Notification Systems. The U.S. Air Force approached NFPA to develop a life safety standard for mass notification that could be used by both military and civilian applications. In 2007, mass notification signaling was introduced into NFPA

72 as Annex material. Then, MNS was incorporated into Chapter 24 of the NFPA 72 2010 Edition. The chapter, "Emergency Communications Systems," also includes emergency voice alarm communication systems (EVACS).

On October 21, 2008, UL addressed requests to establish requirements for mass notification equipment by publishing

continued on page 2



Scan with your mobile QR Code Reader to find out more about UL's research on residential flooring hazards.

Mass Notification Systems UL2572 (continued from cover)

Subject 2572, Outline of Investigation for Control and Communication Units for Mass Notification Systems. Coinciding with the addition of mass notification signaling to NFPA 72, these published requirements were used to assess control equipment for both in-building and wide area mass notification systems. Subsequent editions were issued on March 20, 2009, and October 8, 2009, to cover high power speaker arrays (HPSAs) and distributed recipient mass notification systems (DRMNS) employing dedicated targeted individual receiving equipment.

ANSI/UL2572, Standard for Mass Notification Systems, was published on October 7, 2011. Similar to UL864, Standard for Control Units and Accessories for Fire Alarm Systems, UL2572 was written to align with the performance requirements of NFPA 72. The fire alarm system and MNS must work in a coordinated fashion so not to confuse people. The end-user and their respective stakeholders consider potential hazards associated with their location/facility and then predetermine which type of signal has highest priority, Fire or MNS.

The additions to the first edition of ANSI/UL2572 included an expansion of performance requirements for high power speaker arrays (HPSAs) as well as the inclusion of various distributed recipient mass notification systems (DRMNS), such as: Hosted, Premised-Based, Hybrid, Hybrid-Hosted, and Hybrid-Premise-Based.

ANSI/UL2572 includes requirements for all of the various types of mass notification services, such as:

- **In-Building Mass Notification System**
A system used to provide information and instructions to occupants in a building or other space using voice communication, visible signaling and other communication methods.
- **Wide Area Mass Notification System**
A system which provides real time information to areas, including outdoor, in a contiguous or non-contiguous campus, region or global geographical setting. Wide-area MNS can employ high-power speaker arrays (HPSA) as the auditory means for message conveyance in outdoor areas.
- **Distributed Recipient Mass Notification System**
A system intended to communicate to targeted individuals that may not be in a contiguous area via SMS, email, pop-ups, social media, etc. Note that “DRMNS alerting is not to be used in place of required audible and visible alerting mass notification systems, but shall be integrated with mass notification systems whenever possible” [NFPA 72].

UL delineates in its Certification Directory which published document the particular mass notification product complies with to bridge the time period when both Subject 2572 and ANSI/UL 2572 are in effect. All products will need to meet ANSI/UL 2572 by April 6, 2015. UL’s category control





number (CCN) for mass notification systems is PGWM.

The Mass Notification Systems types referenced above can also interface to each other to create an extensive and comprehensive MNS that can reach a large populace.

Mass Notification Systems “are intended to communicate critical information within buildings and/or outdoor areas about emergencies including but not limited to terrorist activities, hazardous chemical releases, severe weather, fire, and other situations that may endanger the safety of the occupants of an area or facility. Communication is through voice and visual instructions, as well as alert and evacuation signals” [ANSI/UL2572].

Even though ANSI/UL2572 is a Life Safety standard, security aspects had to be considered in regards to an attack on or hacking of the MNS in order to prevent notification or signaling of an emergency event reaching intended recipients with the intent of causing more damage and harm. UL2572 adopted specific security requirements from existing UL security standards, such as encryption of certain communication paths and protection of stored information. Section 40, Security and Data Protection, breaks down into five

different categories with each of them providing various levels of protection:

- Communication Security: Level 0 – 3
- Stored Data: Level 0 – 2
- Access Control Security: Level 0 – 3
- Physical Security: Level 0 – 3
- Audit Control: Level 0 – 3

The MNS manufacturer must specify a level for each area and UL testing will confirm compliance with the specification. Certain installations and/or AHJs may require a higher level of security protection; therefore, a review of the UL Certification Directory will reveal each product’s respective level to determine if the product meets the risk level for the particular application.

Another aspect of UL2572 is Section 36 – Interfaces, where four different Technical Configurations (TCs) are defined with respective performance criteria. Since NFPA 72 Chapter 24 permits the interconnection of Life Safety equipment with other non-performance based systems, UL2572 provides requirements as well as guidance on how this can be achieved without impacting the integrity of a certified Life Safety system.

Mass Notification Systems do not have the advantage of early detection for all types of emergency events like fire alarm systems

have with smoke detectors. With the unpredictability of human actions, tornadoes and other quick onset type events, there is little to no detection. MNS events such as a gunman or hostage event have potential to be dynamic and can last several hours. It is critical for the MNS to have the ability to convey messages in a real-time manner.

Mass notification is a very dynamic concern and UL remains active in identifying issues as well as solutions. UL is participating in and helping sponsor a research project between U.S. Department of Homeland Security and National Institute of Standards and Technology (NIST) in which an in-depth study is being conducted with a focus on three factors: what to say, when and how to say it, and to whom. The goal of the research project is to develop guidance on emergency communication strategies for buildings — specifically regarding human responses/behavior during an emergency — and basic message templates as well as guidance on developing appropriate messages. The intent is to either include the information as annex material of NFPA 72 or at least reference it in NFPA 72 for owners or AHJs to use.

For additional information please contact Derek Mathews at +1.847.664.2928 or at Derek.D.Mathews@ul.com.

TOOLS FOR ACHIEVING CODE COMPLIANCE

UL Certifications and UL Evaluation Reports

Most products used in building construction are required by the model codes (building, fire, mechanical, and energy conservation) to be tested and/or certified by an approved third party certifier in accordance with specific standards. Code compliance can be determined using UL product safety certified products. Several free, easy to use online tools help locate these certifications, including:

- **UL Code Correlation Database**
www.ul.com/codelink
Correlate specific model code section numbers with applicable UL certification information
- **Ultimate Fire Wizard**
www.ul.com/firewizard
Locate a fire resistance rated assembly that meets design specifications and code requirements
- **UL Online Certifications Directory**
www.ul.com/database
Locate a UL Listing or Classification.

However, some products are not addressed in the model codes, or the model codes do not identify specific and clear requirements for certain products, or the model codes have multiple requirements for a product not covered by a single standard. In these situations, additional technical evidence may be needed to determine if a new or alternative material, product, design or method of construction complies with the intent of the model codes. UL Evaluation Reports are intended to provide that technical evidence.

UL Evaluation Reports provide guidance to code authorities, architects, designers, contractors, and installers in determining code compliance of products to model codes, in instances where code requirements exceed the scope of individual UL product safety certifications. These Evaluation Reports do not address building commissioning or field inspections of buildings.

Requirements

UL Evaluation Reports are based on the requirements in the model installation codes, such as the International Building Code (IBC), International Mechanical Code (IMC), International Fire Code (IFC), International Residential Code (IRC) and other standardized requirements.

Where the product is not addressed in the model codes and/or the model installation codes do not identify specific and clear requirements for the product, the applicable International Code Council (ICC) Acceptance Criteria (AC) is used, as identified in the UL Evaluation Report. Where the model codes have clear requirements, but there are multiple requirements for the product (i.e. not covered by a single standard) or the requirements are contained in various sections of the code, the appropriate codes and standards referenced in the model installation codes are used, as identified in the UL Evaluation Report.

The test methods used are considered to meet the intent of the provisions of the model codes identified in an Evaluation Report. The overall purpose of an Evaluation Report is to provide sufficient information

on which Authorities Having Jurisdiction can determine that a product or system, as described in an Evaluation Report, is found to be at least equivalent to what is prescribed in the code in respect to quality, strength, effectiveness, fire resistance, durability, and safety. Wherever possible, the test methods are those specified in the model code, or is a recognized test standard.

UL uses its vast testing experience, knowledge of the product and test standards referenced within the model codes, and full involvement with the model code development processes in evaluating products. Throughout the lifetime of an Evaluation Report, UL regularly audits a manufacturer's production facilities and products to determine continued compliance with the requirements.

Content of reports

Each UL Evaluation Report contains the following information:

- **Report holder name and contact information**
- **Scope of Evaluation** — Includes the model code(s) and identifies the properties evaluated
- **Referenced Documents** — A list of the codes, standards and acceptance criteria used to evaluate the product
- **Product Use and Description** — What the product is and how it is used
- **Performance Characteristics** — A summary of the testing performed and the results of the tests

Evaluation Reports

Category Name	CSI MasterFormat® Division Number	Standards
Thermal Protection	07 20 00	ULEX
Weather Barriers	07 25 00	ULEY
Steep-slope Roofing	07 30 00	ULEZ
Membrane Roofing	07 50 00	ULFB
Roof and Wall Specialties and Accessories	07 70 00	ULFD
Fire and Smoke Protection	07 80 00	ULFE
Plaster and Gypsum Board	09 20 00	ULFP

- **Installation and Conditions of Use** — Information on how the product is to be installed and any limitations on the use of the product
- **Supporting Evidence** — Cross-reference to product certifications and reports that were reviewed to determine compliance
- **Identification** — A summary of product markings for identification of these products.

The products described in each UL Evaluation Report are identified by a marking bearing the manufacturer's name, the product type, and the UL Evaluation Report Number.

Location of reports

UL Evaluation Reports can be found on UL's On-Line Certifications Directory at www.ul.com/database.

General information is covered under the product category for UL Evaluation Reports (ULER). The initial individual categories for specific Evaluation Reports are:

Thermal Protection (ULEX) includes thermal insulation, roof and deck insulation, and exterior insulation and finish systems. Weather Barriers (ULEY) includes vULEX.GuidelInfo ULEX Active 20130124 20130125 vapor retarders and air barriers. Steep Slope Roofing (ULEZ) includes shingles and shakes, roof tiles, and natural

roof coverings. Membrane Roofing (ULFB) includes built-up, fluid-applied, and roll roofing. Roof and Wall Specialties and Accessories (ULFD) includes roof specialties, roof accessories, roof pavers, and wall specialties. Fire and Smoke Protection (ULFE) includes applied fireproofing, board fireproofing, firestopping, smoke seals, and smoke-containment barriers. Plaster and Gypsum Board (ULFP) include plaster and gypsum board assemblies, supports for plaster and gypsum board, backing boards and underlayments, and gypsum board.

For more information on UL's Evaluation Service, please visit www.ul.com/evaluationreports.

UL Awards First UL Evaluation Report to AFM

UL has awarded its first UL Evaluation Report to AFM Corporation for its Foam-Control EPS thermal insulation and geofoam products. UL's Evaluation Report service was launched as a commitment to its customers to help meet their ever increasing need for fast, efficient, cost effective and market accepted code compliance reports.

"Having an Evaluation Report from UL will provide code authorities, architects and other built environment decision makers the confidence and information they need to determine code compliance of our Foam-Control products. Most importantly, UL was able to complete our Evaluation Report quickly and cost effectively, making the process very smooth. Another benefit of our UL Evaluation Report is that it will provide recognition for our Foam-Control products internationally" said Todd Bergstrom, Vice President of AFM Corporation.



UL Offers In-Service Inspection of Aircraft Rescue and Fire Fighting Vehicles

As a result of requests from airport fire departments to conduct in-service testing of pump systems on Aircraft Rescue and Fire Fighting (ARFF) vehicles and performance testing of other ARFF vehicle systems, UL now offers in-service testing of ARFF vehicles based on requirements from the National Fire Protection Association (NFPA) 1911.

NFPA 1911 ARFF vehicle requirements include *Standard for the Inspection, Maintenance, Testing and Retirement of In-Service Automotive Fire Apparatus*; NFPA 414, *Standard for Aircraft Rescue and Fire-Fighting Vehicle*; and NFPA 412, *Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment*.

UL has a long history of working with the fire service for inspecting and testing of in-service fire apparatus. In-service inspection and testing of aerial devices and pumpers is also conducted in accordance with NFPA 1911.

The NFPA 1911 standard provides minimum requirements for maintenance, testing and inspection of urban fire apparatus when placed in service. While there is no specific standard for in-service ARFF vehicles, some airport fire departments have elected to test their ARFF vehicle pumps and water towers ('Extendable Turret') to the requirements of NFPA 1911. It should be noted that the scope of NFPA 1911 in-service pump test is designed primarily for structural firefighting apparatus built per NFPA 1901 and is not applicable for numerous ARFF vehicles configured without a structural firefighting pump system. Fire pumps on ARFF vehicles are not typically configured to provide full structural firefighting capabilities.

Newly manufactured ARFF Vehicles are designed, built and tested under requirements described in NFPA 414. The pump is sized to provide full stream pattern distance and pressure when all turrets, hand lines,

ground sweep, and under truck nozzles are operating simultaneously. The rated capacity of the ARFF fire pump is much greater than the total flow of the outlets that would be used for structural firefighting. To provide an NFPA 1911 like pump test, UL offers the following in-service pump test for ARFF vehicles:

Fire Pump Performance Tests (based on NFPA 1911):

1. Engine Speed Test
2. Priming System Test
3. In lieu of standard NFPA 1911 pumping tests: Pump discharge capacity is determined by size and number of hand line outlets:
 - 20 minutes at 100 percent of discharge outlet capacity at 150 psi net pump pressure





- 10 minutes at 70 percent of discharge outlet capacity at 200 psi net pump pressure
 - 10 minutes at 50 percent of discharge outlet capacity at 250 psi net pump pressure
4. Pressure Control Test
- Close all discharge valves with relief valve set at 150 psi while pumping at full discharge capacity
 - Close all discharge valves with relief valve set at 250 psi while pumping at 50 percent of discharge capacity
5. Vacuum Test
6. Gauge Test: Verify accuracy of pump master gauge and discharge gauges

Aircraft Rescue and Fire Fighting Inspections

UL offers four inspection packages for ARFF vehicles.

Option 1 — Fire Pump Performance Inspection Package

In-service pumps are tested as described above based on NFPA 1911

Option 2 — Foam Delivery Inspection Package

This option consists of the following tests conducted in accordance with NFPA 414 and NFPA 412.

- Agent Discharge Pumping Test
- Pump and Maneuver Test
- Primary Turret Flow Rate Test
- Foam Proportioning Accuracy or Foam Concentration Test

Option 3 — Pump and Foam System Tests

The following tests are conducted in accordance with NFPA 1911 and NFPA 414.

- Fire Pump Performance Test (NFPA 1911)
- Foam Proportioning Accuracy Test (NFPA 1911, Par. 20.3) or Foam Concentration Test (NFPA 414, Sec. 6.4.11).

Option 4 — Ala Carte

Under this option, the owner of the ARFF vehicle(s) selects any of the following tests based on their needs. The ARFF vehicle in-service evaluations are based on NFPA 414, Section 6.4 Operation Tests. NFPA 414 requires that operational tests listed in Section 6.4 be conducted on every new vehicle at the time of manufacture. The

purpose of conducting the following test(s) on in-service ARFF vehicles is to verify that the vehicle is still operating at the same performance levels demonstrated when it was manufactured.

- Fire Pump Performance Test
- Acceleration Test
- Top Speed Test
- Brake Operational Test
- Air System / Air Compressor Test
- Electrical Charging System Test
- Pump and Maneuver Test
- Primary Turret Flow Rate Test
- Agent Discharge Pumping Test
- Foam Proportioning Accuracy Test
- Foam Concentration Test

For questions regarding UL's in-service inspection program for ARFF vehicles or other fire apparatus inspection programs, please contact Tom Hillenbrand at +1.847.664.2603 or at Thomas.A.Hillenbrand@ul.com; or Pat Ginnaty-Moore at +1.847.664.2633 or at Patrick.T.Ginnaty-Moore@ul.com.

Questions & Answers

What Is The Process for Fire Door Inspections and Why are Annual Inspections Required?

The fire door inspection process

Inspections are conducted to the exacting requirements of NFPA 80 and result in an inspection report and UL inspection certificate that state the requirements of the local authority, building official, insurance carrier and the Joint Commission on Healthcare have been met. If any doors are found not to meet the code requirements,

nonconformance will be documented and UL staff will work with you to bring the product into conformance.

Why are annual inspections of fire doors so important?

Fire doors and door hardware are subject to failure due to their constant use in high traffic areas such as busy corridors and stair towers in hospitals, hotels, schools and office buildings. Constant use can lead to failure of the door to close in the event of a fire. NFPA statistics indicate inability

to close is the most common failure of fire doors during a fire. Codes now requiring annual inspection of fire doors have led building owners to seek qualified fire door inspectors like UL to carry out detailed fire door inspections to assure their buildings are in compliance with NFPA 101 and NFPA 80 requirements.

For more information on UL's Fire Door Inspection Service, please contact us at 1.877.854.3577 or email us at: fieldevaluations@ul.com



UL LLC
 333 Pfingsten Road,
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UL presenting at the 2013 NFPA World Safety Conference and Exposition

UL will participate in the 2013 NFPA World Safety Conference and Exposition. Besides an exposition booth (#923), and participation in the Technical Committee Report Session, NFPA has accepted 10 UL presentation topics. The topics cover several important fire, building and electrical issues in the built environment. Some of the topics that UL will be covering include:

- **Smoke Alarm Response and Tenability in Residential Structures**
- **Residential Fire Dynamics**
- **What Is the Latest from UL on Gasoline/Ethanol Blends?**

Please visit UL at booth 923. For additional information on the topics, schedules and other presentations being given by UL staff at the NFPA Conference, visit our website at www.ul.com/NFPA2013.

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A Nationally Recognized Testing Laboratory (NRTL)

W: ul.com/codeauthorities

T: 1.800.595.9844

E: ULRegulatoryServices@ul.com

Managing Editor — Darlene Knauss

T: 1.847.664.3985

E: Darlene.Knauss@ul.com

Editor — Kristin Davis

T: 1.847.664.2670

E: Kristin.P.Davis@ul.com

Address changes and additions —

Diane Fonzino

E: Diane.E.Fonzino@ul.com