

## 28 46 00 | Fire Detection and Alarm

This document provides UA's standards for the design and installation of fire alarm systems and equipment in new construction, retrofit of new systems into existing buildings, and modifications to existing systems. These standards address issues beyond minimal code requirements, and reflect the University's understanding of the importance of fire alarms in buildings, our commitment to providing safe facilities for the University Community.

Over the years, UA has developed a technologically advanced campus-wide fire alarm system through the standardization and integration of each new individual building system. These standards assure that each new system will have the proper technology to be fully compatible with the campus network, and to provide the level of fire protection the university desires.

In applying these standards to the design of a new system, designers are expected to follow everything listed without exception. Should a specific situation arise where the system designer believes that a variance from these standards is warranted, permission must be obtained from the University.

To determine the level of protection appropriate for a given type of building, several risk factors were considered. These were:

- Building Size – Both the height and total area.
- Building Use – How the building is used and what hazards are present.
- Occupant Load – Number of people occupying the building.
- Type of Construction – Combustible, non-combustible, fire protected, etc.
- Sprinkler Protection – Whether or not the building will be sprinklered.

Another factor considered was the need for a non-fire related emergency communication system in these buildings. A voice fire alarm system provides a public address function by use of the control panel microphone. This can effectively be used to communicate to all of the building's occupants for any type of emergency, even when building evacuation is not needed.

Finally, there were many other issues that were addressed in developing these standards including; needs of the disabled, cost, aesthetics, fire department response, false alarms, testing, maintenance, State procurement regulations, and many others.

### A. Design Phase Procedural Requirements

1. The latest published edition of NFPA 72 and IBC adopted by the State of Alabama shall be used for all new fire alarm systems.
2. Additionally UA requires some added devices which will be covered later in this document.
3. The eventual communications protocol for the campus fire alarm network is proprietary to Simplex. No other manufacturer's equipment can be properly integrated into the network, and provide the two-way communication needed for monitoring and control of the existing systems. Therefore, all fire alarm equipment shall be manufactured by Simplex.



4. As part of their service to the University, Simplex provides a high level of engineering support to A/E's for the design of our new systems. A/E's can contact the Birmingham branch office of SimplexGrinnell (205- 948-3200) for their assistance for every project. We rely heavily on Simplex's input to assure compliance with codes and university standards, and for proper integration of new systems into the campus network.
5. UA shall assist the A/E by:
  - a. Providing UA specifications to the A/E for their use.
  - b. Meeting with A/E to go over basic system design issues.
  - c. Reviewing working drawing design documents to assure system equipment is properly specified, and located within the building in compliance with codes and university standards.
  - d. Analyzing existing equipment impacted by any new installation to ensure that it can work properly with the new equipment.
  - e. Simplex will send the CAD drawing files they have prepared showing final device locations to Environmental Health and Safety Services.
6. Provisions must be made to update the campus fire alarm network when new systems are added. The TSW in the UA Police Department and other locations must be reprogrammed to include any new systems added to the network.

## **B. General Design Standards**

1. General: The following requirements are applicable to all fire alarm systems regardless of the type of building in which the system is installed.
2. Simplex – All equipment shall be manufactured by Simplex.
3. Control & Annunciator Panels:
  - a. Location of Control Panel – The fire alarm control panel shall be located in a conditioned electrical room, unless changed by the University.
  - b. Remote annunciator panels shall be located at the primary entry point, at the front entrance.
  - c. Max Limitation on Power Supplies – The design load placed on the power supply shall not exceed eighty percent of the power supply capacity.
  - d. Individual signal circuits shall not exceed eighty percent of the card capacity.
  - e. Location of Secondary Panels – All secondary panels for the fire alarm system shall be located in conditioned electrical closets, unless changed by the University.



- f. Batteries serving the FACP installed in separate cabinets shall be located adjacent to the FACP and no higher than three feet above the floor.
  - g. Emergency Power – Where a generator is present, the FACP and all secondary panels shall be tied to the emergency circuit, and batteries shall also be provided, sized per NFPA 72 requirements. Where there is no generator, batteries shall be provided and sized per NFPA 72 requirements as the secondary power source.
  - h. Where smoke control or stairwell pressurization systems are being installed, the FACP shall provide a manual means of activating and disabling these systems. Switches shall be clearly labeled as to the specific system they control with LED's showing status.
  - i. Degree of point reporting – All panels shall connect to the University Fire Alarm Network and report point to point information. All connections to the network will be via single mode fiber modems unless otherwise directed by the University.
4. Initiating Devices:
- a. Location of Pull Stations – At all egress doors and be semi-flush mounted, including retrofit.
  - b. All pull stations shall be Double action. Stopper covers only required at residential buildings.
  - c. Heat, smoke, and duct detectors shall be True Alarm type.
  - d. Addressable initiating devices – All devices shall be addressable type devices.
  - e. Duct detectors – A remote Indicator with test switch shall be placed on a wall or ceiling in public area where it will be readily visible and will not be obstructed by furniture, and shall be located as close as possible to the AHU. Signage shall be provided indicating the AHU served. Provide test switches.
5. Notification Devices:
- a. Strobes shall be installed in conformance with NFPA 72.
  - b. Ceiling mounted strobes are acceptable if prior approval from the University is obtained.
  - c. Location of Strobes – All public spaces listed above for detection; and also, classrooms, bathrooms, laboratories, assembly spaces, conference rooms, shops with high ambient noise levels, mechanical rooms and other areas as required by the IBC. Placement shall be made with consideration of ambient light levels.
  - d. Synchronization of Strobes – Strobes shall be synchronized.
  - e. The University prefers to use the right candela size for the particular application instead of calling out one particular candela size for all.



- f. Mounting Height of Strobes – Wall mounted strobes must be installed so that the bottom of the device is a minimum of 80” and a maximum of 96” above finish floor.
  - g. Speakers that are installed separately from strobes must be mounted at least 90 inches AFF or ceiling mounted speakers.
  - h. A/V unit mounting heights are dictated by the requirements for the strobe, not the speaker.
  - i. All systems will use speakers and all strobes will be dual amber/clear strobes. All strobe units shall be addressable.
  - j. There are some instances where horn/strobes will be used to match existing conditions on modifications.
6. Circuits and Wiring:
- a. FACP network connections will be done by single mode fiber modems. A one inch conduit is needed between panel location and data closet. The 1” conduit should contain 1 pair #14 THHN wire and one cat5 cable. A second 1” conduit is needed from the FACP to the same data closet for mass notification. UA will run needed wire.
  - b. Class B circuits shall be used on all circuits, except for Student Housing, unless prior approval to use Class A circuits has been given by the University. In Student Housing, all circuits shall be Class B except for communication between FACP and remote panels, then Class A will be used.
  - c. Conduit – For new construction, wire in red EMT conduit. Cable that is not in EMT can be used only with prior approval of the University. The same goes for all retrofit projects.
  - d. No conduit or EMT shall be run below slabs.
  - e. Wiremold may be used in retrofit installations, but only with the university’s permission.
7. Interface with Other Fire Protection Systems:
- a. Where the building contains other fire related systems, such as sprinklers, hood suppression, fire door hold-open devices, etc., these systems shall be connected to the new FACP and monitored for alarms, trouble, or supervisory conditions.
  - b. The A/E shall coordinate the sprinkler/fire pump and fire alarm design to help assure that the number of flow; tamper and pressure switches are identified as accurately as possible in the working drawing design.
  - c. Where a fire pump is present, a “pump running” condition shall be treated as a supervisory condition, and not an alarm.
  - d. Where dry-pipe valves are installed in buildings not normally occupied, where loss of heat in the room could go undetected, a true alarm heat detector shall be installed and programmed to monitor the room for low air temperature (40 degrees F). The detector shall be wall mounted located at the same elevation as the dry valve.



- e. No exterior tamper switches shall be monitored by Fire Alarm System. They will be locked by UA.
  - f. Every tamper and flow switch shall be individually addressed, regardless of their proximity to other devices.
  - g. No devices shall be put in outdoor pits. Sprinkler valves in outside pits shall be chained and locked.
  - h. Pre-action systems and gas detection systems shall be separate systems from the building FACP. These systems shall be monitored by the building FACP. Gas systems shall never be monitored by a pre-action panel.
8. Miscellaneous:
- a. Color of Devices: Panels – Beige; Pull Stations – Red; A/V Devices – Red. All ceiling mounted devices shall be white.
  - b. Consideration shall be given to any room within the building that may be subject to wash-down cleaning.

### **C. Building Specific Design Standards**

1. Panel Model – 4100ES or the latest version of this level of panel.
2. Type of Notification Devices – All notification audible devices shall be speakers. All visible devices shall be dual amber/clear addressable strobes. When designing, use a dual strobe on wall with ceiling speakers. If ceiling speaker is not feasible, then wall mount is acceptable. If ceiling mounting strobes, a ceiling speaker strobe will be used with an adjacent amber strobe.
3. Level of Automatic Detection – For non-sprinklered buildings, public area smoke detection shall be provided. This will include areas such as lobbies, hallways, reception areas, above every floor landing in all stairwells, elevator lobbies, laundry rooms, janitor closets without sinks, mechanical equipment rooms and similar spaces. Auditoriums shall be addressed on a case-by-case basis, with university consultation.
4. Specific areas that require heat detection in non-sprinklered buildings – mechanical equipment rooms; attics and crawl spaces built with combustible construction; chemical storage rooms; shop areas used for welding, woodworking, painting, and janitor closets with sinks, etc.; or any other area with a hazard that warrants heat detection as determined by the University.
5. Specific areas that require smoke detection in non-sprinklered buildings – CNS communication closets; large electrical rooms containing either distribution transformers or switchgear; at the FACP; storage rooms that are larger than closets.
6. Laboratories involving hazardous operations must be evaluated for the need for automatic detection (either heat or smoke) on a case-by-case basis.



7. Specific areas that require smoke detection in sprinklered buildings – elevator lobbies, CNS communication, laundry rooms, janitor closets without sinks, at the FACP and storage rooms that are larger than closets.
8. Specific area that requires heat detection is sprinklered buildings – Transformers vaults, janitor closets and kitchens.
9. Elevators and elevator machine rooms will follow NFPA and State requirements. Coordinate with sprinkler engineer and architect.
10. All sleeping rooms shall be equipped with a system smoke detector.
11. All student housing shall be equipped with smoke detector in corridors and common areas of sleeping room floors, whether sprinklered or non-sprinklered.
12. Pull stations are required in all buildings (sprinklered or non-sprinklered).
13. All sleeping rooms shall have speaker to meet 75 dB at pillow.
14. CO detectors shall be installed in residential occupancies, where fuel appliances (i.e., gas, wood, charcoal) are present (only at the appliance). CO detectors will be a combination smoke/CO or heat/CO connected to the FACP.
15. All stairwells will have a speaker and an amber and clear strobe present at ground floor landing.
16. Outdoor devices shall only be installed where required and beneath awnings if possible. No outdoor speaker will be allowed; a standard weatherproof horn strobe will need to be used. This should be located above Knox box wherever possible. City of Tuscaloosa requires at least one at a visible location.
17. All fire alarm systems that cannot be put onto UA Fiber Network shall be cellular monitored.
18. When door magnets are used, they must be “Simplex RSG Electromagnetic” type.
  - a. Floor mount door holders are not acceptable.
  - b. Rods exceeding 4 inches (DHE4APC or DHE4AB – Catch plate with adjustable extender rod, 4” (102mm) long with center pivot) are not acceptable.
  - c. Flush mount boxes must be secured to a wall stud. If this cannot be done, a surface mounted box attached to a wall stud shall be used. After work “cut-in” boxes are not allowed.
  - d. In areas where the above requirements cannot be met, door hold backs built into the door casing shall be used.
19. When renovation work is performed, any new wiring shall match existing.
20. All restrooms will have a strobe and a speaker.



#### **D. Acceptance Testing and Warranty Period**

1. Simplex will provide the university with a written statement verifying the successful completion of all required tests. This document will be required at the time of substantial completion, before a Certificate of Occupancy can be obtained for the building. A copy must also be provided to the State Fire Marshal's Office.
2. Warranty – One year from time of acceptance or substantial completion.

- End -

