SECTION 16721

FIRE ALARM SYSTEMS

Part 1 -Design Directives

Install fire alarm systems in accordance with NFPA 72, edition as enforced by local authority.

Fire alarm wiring shall be installed in a system of EMT. All boxes and pull fittings of the fire alarm raceway system shall be painted red. The accessibility requirements for raceways and junction boxes detailed in other sections of the standard shall be strictly enforced on fire alarm installations. All wiring shall be color-coded and sized as outlined below:

Campus Connection Outside Plant Cable: Provide cable from building to building termination points via Communication ductbanks/manholes as directed by FO&M. Termination points to be located in main Tel/Dat rooms. ~~Cable shall be equivalent to: SUPERIOR ESSEX K-2001/25 PAIR/26 AWG/90 DEGREE DRY/.010 INS THICKNESS – FOR CLASS 2 POWER LIMITED CIRCUITS.~~ *Device shall be either a Keltron PET402 or PET404 (depending on HFD and DC-FOM determination). Cable shall be two 6pair, 22 AWG, direct-burial rated telephone cable. Cable shall be identified as "FIRE ALARM" with permanent tags attached every 15 ft.*

Provide lightning protection arrestors at building termination point.

Detection loops (heat, smoke and pull stations) of non addressable systems only shall be color coded by building floor. The solid color conductor shall be used for the positive polarity side of all circuits. Starting on the lowest level of a building the colors shall be:

Blue and White with blue stripe
Orange and White with orange stripe
Green and White with green stripe
Brown and White with brown stripe
Slate and White with slate stripe
Yellow and White with yellow stripe

This wire shall be #16 stranded with PVC insulation mil spec. MIL-W-16878/1, type B. This wire is available from Anixter, Belden, and Carroll.

Detection loops (heat, smoke and pull stations) of addressable systems shall be color coded using yellow and purple 14 gage THHN.

All fire alarm wiring shall conform to Class A.

When renovating existing dormitory spaces, use an AC powered with battery back-up style smoke detector unit in dormitory rooms.
Smoke detectors shall be installed as required by code. Smoke detectors shall be installed in all hallways and stairwells regardless of code requirements.

All products shall have a UL listing.

Smoke & Heat Detectors

Smoke detectors shall be installed in all mechanical, electrical, tel/data and storage rooms as well as concealed but accessible areas like crawl spaces and attics. Heat detectors shall be installed in cold attics and mechanical spaces, and in dirty environments such as dirt floor crawl spaces.

Refer to DC Standards 15890-METAL DUCTWORK & ACCESSORIES, for location of smoke detectors serving air handling equipment.

Sprinkler Systems Devices shall be wired with Red and white with Red stripe conductors which shall be sized #16 with PVC insulation mil spec. MIL-W-16878/1, type B. This wire is available from Anixter, Belden, and Carroll.

Notification Appliances shall be wired with Red and Black conductors which shall be #14 type THHN stranded conductors as a minimum.

Speaker Appliances shall be wired with 16 gauge minimum, twisted shielded Type FPLR (riser) / FPLP (plenum). Color of jacket shall be red.

Door Hold Open Devices shall be wired with Blue and White conductors which shall be sized #14 type THHN stranded conductors as a minimum.

~~**Digitizer Cable**~~
~~The fire alarm cable to be utilized in supplying digitizer service to a single point of service shall be a #18 AWG two (2) pair (red/black and green/white) non-shielded with an overall plastic or rubber jacket that is colored red.~~

Smoke evacuation systems shall be designed to have a 3-way selector switch (bypass/auto/ over-ride) that is wired to provide a panel trouble when the switch is not in the auto position.

Addressable fire alarm systems shall have as-built documentation that identifies the location and address of each device connected to the system on a reflected ceiling plan preferably in an 11″ by 17″ drawing format. The contractor shall also provide an as-built schedule of devices and addresses with all logic outputs and updated manufacturers schematic and riser diagrams.

Addressable fire alarm system panels shall be configured and programmed so that all smoke detectors on a single floor can be disabled with a single program command. Similar systems shall be numbered consecutively on each data loop such as sprinkler systems.

In buildings with a non addressable system, pull stations shall not be on the same loop as smoke and heat detectors.

Keying
Keying for panels, pull stations and other keyed devices shall be standardized to: PK 625 or Cat 30.

Part 2 -Products

Fire Alarm Panels shall be:

Manufacturer	Conventional System	Addressable System
Edwards ~~Sytsem~~*System* Technology	EST	EST
FCI	FCI 72	FCI 7100
Mircom		FX2000

All addressable fire alarm panels shall be equipped with the necessary options to support the connection of a laptop PC to interrogate the system for the purposes of troubleshooting and programming.

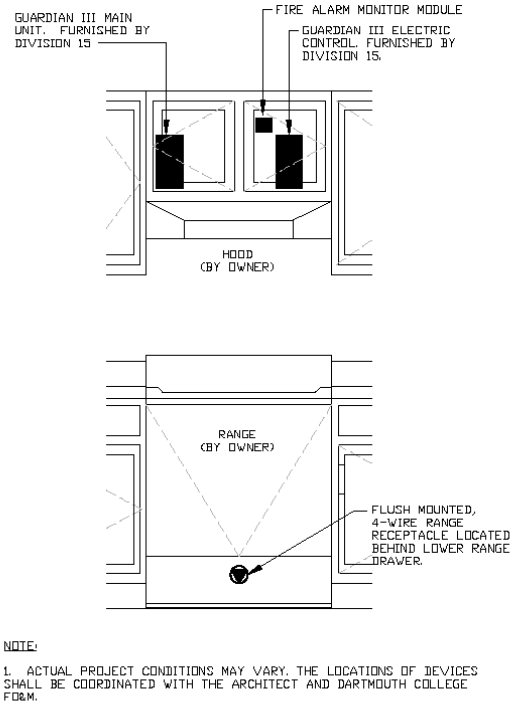
Smoke Detectors shall be:

SMOKE DETECTORS		
Location	Style	Part Number
Dormitory Rooms & living spaces	Photo-electric	Manufactured by BRK, a/c powered with battery back-up
All Others:	Ionization type	UL listed to be compatible with system
	Photo-electric	UL listed to be compatible with system

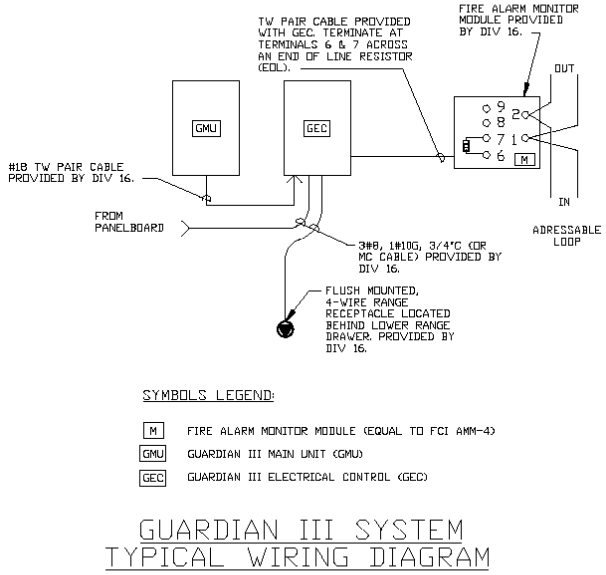
Both photo-electric and ionization type detectors are listed. The designer is required to consult with FO&M to determine the application of the appropriate style smoke detector.

All addressable smoke detectors shall be capable of being independently programmed and re-programmed from the main fire alarm control panel. Smoke detectors which cannot be removed and replaced in another location will not be accepted.

Range Hood Fire Suppression Systems: Range hood fire suppression systems shall be installed for all ranges. The system shall be a Guardian III Systems and shall be connected to the fire alarm system by means of a monitor module. The Guardian III system is designed to disconnect power to the range. See the following detail drawings for wiring and device locations.



GUARDIAN III SYSTEM RANGE AND HOOD DETAIL



GUARDIAN III SYSTEM RISER DIAGRAM

Part 3 -Execution

Fire alarm components shall be installed per NFPA 72 and the manufacturer's written instructions.

Circuit breakers supplying power to fire alarm panels shall be equipped with a red colored locking device that prevents the accidental operation of the breaker to the off position.

The contractor shall provide a "System Completion Record" as specified in NFPA-72. The completed form shall be submitted to the Hanover Fire Department and Dartmouth College.

On renovation projects the contractor may be assessed a fine by the Hanover Fire Department for any false alarm that is initiated by the construction process.

The contractor must reference section 01000, GENERAL REQUIREMENTS, relative to the procedures for turning on and off fire alarm systems.