

## DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

### 28 05 37 – Distributed Antenna System / Bi-directional Amplifier

1. Per building; located pending signal.

### 28 15 00 – Access Control Hardware Devices

1. At the discretion of and approval by the Public Safety Department (Director of Physical Security and Technical Applications), install card/mobile ID access device (DesFire/NFC compatible) in the following locations:
  - a. Main exterior doors of new residential and academic facilities and near 1st floor elevators to restrict access to upper residential floors. All exterior doors will include electronic door hardware for lockdown purposes. EX: bank of 4 doors will include (1) card access device and 2 doors to be electrified. The exit doors will remain locked in this scenario.
  - b. Main entrances into computer/research labs, employee entrances at cash handling units, facilities with extended after-hour usage (such as The SHED, Wallace Center, Campus Center, Fitness Centers), large classrooms/study rooms, office suites (to control the perimeter of the secured space, not individual office doors), and any spaces determined by Public Safety to be secured for their intended use.
  - c. High risk areas where mechanical keys are not issued to employees or students.
  - d. In some instances, an intercom device may be installed at card access locations. All intercom devices need to be reviewed and approved by the Public Safety Department.
  - e. Card readers shall be installed at 36" to centerline AFF. Align device with room sign and scheduling tablet. Reference Appendix 4 in Division 28 for detail.
2. The access control installation shall minimally include door contacts and request to exit devices (REX) to allow for proper monitoring of the door (door forced, door held events). Other situations may require integration with existing or proposed intrusion alarm systems with the use of a pin and card/mobile ID access control device.
3. See 10 41 16 for Knox Box requirements.

### 28 20 00 – Video Surveillance

1. At the discretion of and approval by the Public Safety Department, install networked surveillance cameras in the following locations:
  - a. All building entrances/exits, stairwells, elevator lobbies, secured spaces which require ingress of students, faculty or staff, computer/research labs, large gathering areas (lecture halls, auditoriums, athletic facilities, etc), and any other spaces determined by Public Safety to be monitored for their intended use.
  - b. Cameras may also be used as alarm systems to notify Public Safety of motion in areas determined to be unsafe, high risk, or secure spaces.
  - c. Public Safety may recommend exterior cameras be installed to enhance perimeter security for the building, parking lot, or surrounding exterior spaces.
2. All camera models will be selected by Public Safety based on the area that needs to be monitored and factors such as analytics, frames per second, wide dynamic range, lens focal length, and other technical specifications.
3. All cameras will be programmed by Public Safety on the current RIT owned VMS (Milestone) and roles will be assigned to users in accordance with the RIT Privacy Policy (<https://www.rit.edu/policies/c070>), Section 13.
4. All cameras must include a video channel license to be installed on the VMS.

### 28 30 00 – Security Detection, Alarm, Monitoring

1. Included devices:
  - a. Intrusion panel
  - b. Alarm annunciator keypad
  - c. Door contacts
  - d. Motion detectors
  - e. Panic/duress buttons (wireless, desk mounted, wall mounted)
  - f. Sonic safe sensors
  - g. Fiber loops (expensive equipment in non-secured areas)
  - h. Glass break devices
  - i. Water bugs/environmental detection devices
2. At the discretion of and approval by the Public Safety Department, security alarm systems will be installed in areas where the need exists to protect assets, student, employees, and cash-handling operations.
3. At the discretion of and approval by the Public Safety Department, intrusion alarm systems may be integrated with campus access control and video management systems to provide real time monitoring for Public Safety

Communications. This includes but may not be limited to card/pin access control devices integrated with intrusion systems to control access to areas and master pin control for disarming purposes.

4. At the discretion of and approval by the Public Safety Department, panic/duress devices will be installed in areas where student populations congregate outside of normal business hours, front desk operations, all cash handling locations.
5. All other devices listed above may be proposed after a Public Safety Physical Security Review of the space and/or proposed plans for renovation/new build.

## 28 46 00 – Fire Detection and Alarm

1. Submittal and Construction Process
  - a. MEP consultant to Owner will perform preliminary design to applicable codes, standards, RIT Design and Construction Guidelines, RIT insurance carrier requirements, and Town of Henrietta Fire Alarm Submittal Checklist (<https://www.henrietta.org/media/2266>).
  - b. All selected hardware and software will carry a minimum service and replacement life of at least 10 years maintaining full product compatibility and manufacturers support for the 10 year period.
  - c. Contractor to provide Owner with a submittal of a full set of shop drawings, specifications, materials list, product cut sheets, and any other items required as per Town of Henrietta Fire Alarm Submittal Checklist for Owner review before applying to the town for the Fire Alarm Permit.
  - d. Submittal shall comply with these guidelines and Town of Henrietta Fire Alarm Submittal Checklist in addition to all applicable codes, standards, and RIT insurance carrier requirements.
  - e. Submittal shall include a completed copy of the Town of Henrietta Fire Alarm Submittal Checklist.
  - f. Owner shall review submittal and meet with contractor to resolve any issues.
  - g. Contractor shall apply for Fire Alarm Permit after Owner approves submittal.
  - h. Contractor and Owner shall meet and review materials and installation locations before ordering and rough in. This is to ensure correct materials and mounting height compliance with these guidelines.
  - i. Acceptance testing to be performed in full uninhibited normal operation mode.
  - j. Confirm all auxiliary functions perform correctly including walk test feature as specified by Owner.
  - k. Warranty period shall be 1 year full parts and labor.
  - l. After Acceptance testing, perform a 2<sup>nd</sup> full test of the system, at no charge to the owner, before the end of the warranty period at a time and date to be set by the Owner.
2. FMS will assign ADDRESS LABELS for all reporting points on fire alarm system. Contractor will supply FMS with Excel spreadsheet with device addresses, description, and floor plans showing device locations. FMS will assign labels and return spreadsheet for loading into FACP.
3. The university's room numbering must be used to program the labels for the points in the control panel. The numbering typically will not be finalized until the later part of the project.
4. Minimum conduit size shall be 3/4" EMT, and all conduit shall be RED in color.
5. No conduits shall be mounted tight to the roof deck.
6. Fire Alarm system batteries shall be mounted in separate enclosure from the FACP. Battery enclosures to be mounted on vertically mounted Kindorff stand offs in close proximity of FACP.
7. An Alternate for unit pricing of detectors, pull stations, addressable strobes and horns shall be included with the bid package.
8. COMPLETE as-built drawings and riser diagrams with device addresses and installation documentation (including complete manual sets) of each device, shall be provided to Owner.
9. A digital copy of the as-built drawings in AutoCAD and PDF format shall be provided to Owner, and become property of the Owner. Drawings to be black and white only with all lines and devices labeled, no color on hardcopy, PDF, and AutoCAD sets.
10. Warranty shall be for One Year and include a 4 hour response time by the Fire Alarm Contractor 24 Hours Per day including weekends and Holidays and shall commence after Acceptance Test.
11. All Devices will be visibly labeled with device address.
12. See appendices for wire information at end of this Guideline.

## 28 46 10 – Detection and Initiation

1. All sensors and detectors shall be UL listed and FM approved.
2. **ALL** field devices shall be programmed with individual addresses.
3. **ALL** monitoring/supervisory devices shall be programmed with an individual address.
4. Every fire sprinkler system tamper and flow switch shall be individually addressed, regardless of their proximity to other devices.
5. Where a Fire Pump is present, a "Pump Running" condition shall be treated as a supervisory condition, not an alarm.

6. **ALL** photoelectric smoke sensors shall be intelligent analog type detectors.
7. **ALL** thermal sensors shall be intelligent analog type detectors.
8. **ALL** duct detectors shall be the sample tube type and have key operated testing stations accessibly mounted (test switch to be mounted no higher than 72").
9. **ALL** duct detectors shall report as a supervisory trouble and latch so that a reset is required.
10. **ALL** projected beam smoke detectors will have local key operated testing stations accessibly mounted (test switch to be mounted no higher than 72"). When a key station is not available, a means for remote testing shall be provided.
11. Addressable module for projected beam smoke detector shall be mounted behind key in remote test station or in a box not more than 72" AFF.
12. **ALL** (pull) manual stations shall be intelligent individual address dual-action type with B Key operated reset, requiring operator to make two (2) distinct and separate actions to initiate alarm.
13. STI-1100 cover shall be provided at all pull stations.
14. Line isolators shall be installed every 30 devices, allowing no more than 30 devices to be affected in the event of a wiring fault. Use only Line Isolator Modules. NO Isolator Bases shall be used. All Line Isolators Modules shall be located and labeled in the FACP.
15. **ALL** devices located above ceilings shall have a remote LED indicator mounted on the wall at eye level as near as possible below the device and labeled accordingly.
16. **ALL DEVICES MUST BE INSTALLED WITH GOOD ACCESS FOR SERVICING AND BE ABLE TO BE SERVICED FROM AN 8 FOOT LADDER.**
17. Smoke detector zones shall incorporate and utilize a smoke alarm verification feature, whereby a delay is allowed in alarm sequence to allow verification of alarm received.
18. Initiating device circuits shall be wired Class A to line isolators.
19. Smoke detection shall never be installed in:
  - a. Laboratory fume hood exhaust,
  - b. Maintenance or mechanical areas (with the exception of a smoke detector as required near the FACP).
  - c. Attics, Exterior of buildings, or any location where temperature may be below 40°F or above 100°F, or where high humidity, dust, insects or airborne particulates might be present.
20. Smoke detectors shall be a minimum of 3 feet from HVAC diffusers.
21. Batteries shall not be used in any devices. Devices shall be hardwired back to FACP or appropriate power source as approved by Owner.
22. Where or custom ceilings (i.e. clouds) are incorporated in the building, ensure fire alarm system design is appropriate, code compliant (heads above and below ceiling as required), and accessible.

## 28 46 21 – Addressable Fire Alarm Systems

1. Fire Alarm Control Panels (FACP) models
  - a. SIMPLEX FACP, minimally 4100U/ES model
2. FACP Features
  - a. Shall be totally solid state microprocessor based, use digital transmission and shall be field programmable.
  - b. Full detector sensitivity and device service status reporting.
  - c. **A minimum** of four (4) Programmable function switches located at main FACP and annunciators.
  - d. Dedicated network communications meeting 100% COMPATIBILITY with existing network fire systems.
  - e. Capacity to disable horns & strobes from the panel.
  - f. Capacity to disable fans, door holders, elevators, water flows, suppression systems, etc. from the panel.
  - g. Capacity to silence Audible Circuits (from FACP).
  - h. LCD Annunciators, with Bypasses programmed at annunciators as well as FACP.
  - i. Remote System annunciator shall be located at the Fire Department response location and shall be readily visible in the entrance lobby or vestibule. Display shall be at eyelevel between 60" and 68".
  - j. All system conditions shall be annunciated through LCD annunciator and network monitors.
  - k. FACP shall not be installed in any area where ambient temp could exceed 86°F or fall below 40°F or where excessive humidity or dust might be present. Control unit shall incorporate an "Event Memory" and the ability to access and view each event in memory from the keypad.
  - l. FACP shall provide **AT LEAST** two free internal expansion card bays for future expansion.
  - m. The FACP shall be used to control pre-action fire sprinkler systems. The FACP panel must be UL listed and approved for this function.
  - n. **ALL** Fan Shutdown Relays shall be addressable monitored devices that may be bypassed at the main FACP,

- and locally indicate the operational state (status LED on control relay shall be at or near eye level) of the relay. All shutdown controls shall be wired to the normally open, held closed, contacts during normal status (no Alarm) of the FACP. The status LED shall be lit for normal operation (see wiring diagram).
- o. **ALL** Smoke Vent Releases shall have associated service bypass control switched from the main FACP front panel.
  - p. **ALL** Smoke Vent Releases will utilize 24 volt reset-able latching devices only, and shall be battery backed by main FACP or auxiliary supply. Fusible links shall not be a primary releasing mechanism and no ETL links will be used.
  - q. **ALL** Door Holder Circuits shall be 24 Volts DC and be on separate dedicated power supplies and have associated service bypass control switched from the main FACP front panel. By having separate power supplies for Door Holders, it prevents loss of main power supply due to a shorted Door Holder circuit.
  - r. Provide fire alarm circuits to elevator controller. Provide four supervised relays near the elevator controller. Program FACP, relays and elevator related smoke and heat detectors as per FMS Design and Construction Guidelines Division 14. LED on relay shall be solid "ON" when relay is commanding elevator (i.e. Fire-Service recall primary).
3. FACP Network Communications
- a. Provide modules for connection to existing RIT campus fire alarm network.
  - b. All FACP's shall be NETWORKED to FMS Fire Alarms Systems Shop (located in Building 49, Room A063/065) & Public Safety Dispatch Center (located in Building 025 Grace Watson).
  - c. All networked FACP's will provide a BI-DIRECTIONAL communication interface to both Campus Safety monitoring station and FMS Bldg. 49 Fire Alarm Systems Shop.
  - d. All networked systems shall allow for both "Local Reset" and "Reset From Networked Head End".
4. FACP Wiring
- a. FACP shall be wired to building LIFE SAFETY EMERGENCY POWER (110 VAC) with circuit labeling placed on FACP faceplate upper right hand corner including FACP indicated on panel circuit schedule.
  - b. Identify Fire Alarm circuits with printable tape at all terminal and junction locations in a manner that will prevent unintentional interference with the fire alarm circuits during testing and servicing (760.10).
5. Addressable Loop Wiring
- a. **ALL** Addressable Loops shall be wired using STRANDED #18/2 conductor, shielded, with a drain wire, with conductor insulation colored red and black, RED PVC jacket, FPLP rated cable UL approved for use in fire alarm system wiring and approved by FMS (see wire information at end of this Guideline).
  - b. Addressable loops will be wired as a riser/backbone and branch circuit configuration. The Riser/Backbone shall not serve detectors directly, but will supply data feed to all line isolators. Line Isolators will be the only interface points for all branch circuits. Branch Circuits will supply data feed to all addressable devices. **NO MORE THAN 30 DEVICES** will be supplied by a single branch circuit. A Line Isolator shall not supply data to any more than a SINGLE branch circuit serving no more than 30 devices.
6. Other Fire Alarm System Wiring
- a. **ALL** Visual Notification Appliance circuits (Strobes) shall be wired using STRANDED #14/2 conductor cable, with a RED PVC jacket, with conductor insulation colored red and black, FPLP rated cable UL approved for use in fire alarm system wiring and approved by FMS (see wire information at end of this Guideline).
  - b. **ALL** Audible Horn Notification appliance circuits shall be wired using STRANDED #14/ 2 conductor cable, with a RED PVC jacket, with conductor insulation colored red and black, FPLP rated cable UL approved for use in fire alarm system wiring and approved by FMS.
  - c. **ALL** Audible Speaker Notification appliance circuits shall be wired using STRANDED #18/2 or #14/2 conductor, shielded, with a drain wire, with conductor insulation colored white and black, RED PVC jacket, FPLP rated cable UL approved for use in fire alarm system wiring and approved by FMS (see manufacturers wiring requirements).
  - d. **ALL** wiring associated with fire alarm systems must be in metal conduit, 3/4 inch EMT minimum size and colored RED.
  - e. **ALL** Audible and Visual Notification Appliance Circuits shall be wired CLASS "A" (unless otherwise approved by FMS).
  - f. ALL Fire Alarm system junction boxes and cover plates shall be painted RED.
  - g. 24 Volt DC AUX wiring shall be run along with all addressable loop data cables.
  - h. **All** Door Holder Circuits shall be 24 VOLT DC and powered by separate dedicated power supplies (separate from power supply for Fire Alarm system). Power Supplies shall be a minimum of four (4) Outputs. Each Output shall be individually fused.
  - i. **All** Door Holder power supplies will initiate from dry contacts.
  - j. No battery backup shall be used on door holder power supplies.

- k. Any fire alarm system wiring serving devices that may be exposed to moisture shall be on an individual isolated loop.
- l. All fire dampers shall be 24 volt and powered by the FACP. Larger dampers may 115 VAC if approved by the RIT Director of Engineering and interfaced to the FACP with an output ZAM and Air Products relay with indicator LED.
- 7. Installation of FACP (CPU) and Transponder (RPU) units
  - a. All system enclosures housing central and remote processing units, and surface mounted annunciators shall be mounted using standoff bolts or vertically mounted Kindorf to isolate the enclosure from water/moisture contamination.
  - b. All enclosures housing LCD DISPLAY CONSOLES shall be mounted so that the display is placed between 60" and 68" above the floor (eye level).
  - c. All equipment, devices, and installation shall conform to NFPA 72, NEC, and ADA requirements.
  - d. Strobes shall be mounted at 80"-96" AFF.
  - e. The operable part of Manual Pull Stations shall be mounted 42"-48" AFF.
- 8. NAC Power Supplies
  - a. **All** NAC power extenders shall be mounted alongside of FACP using standoff bolts or vertically mounted Kindorf.
  - b. **All** interfacing modules and visual synchronizing devices shall be mounted, on standoff bolts or vertically mounted Kindorf, in close proximity to their associated power supplies and labeled accordingly to reflect address, purpose and circuit.
  - c. **All** NAC Supplies shall be labeled by NAC number and circuit number including type of circuit for area served (i.e. NAC 1 Circuit 2 Horns).
  - d. **All** NAC CIRCUITS shall be calculated for all NAC devices to be operated at their maximum output level and tap. Included within this calculation shall be an adequate allowance for expansion of at least 25%.
- 9. Fan Control Interfaces
  - a. **All** FAN CONTROL relays shall be mounted next to or in close proximity to associated motor control / speed drives that are being interrupted.
  - b. **All** control relays shall be mounted with LED status indicators within 36"-72" of fan contactor or VSD and be labeled for both duct detector address and air handler associated with shutdown.
  - c. LED shall be "ON" for run condition.
  - d. Relays shall be wired per Owner drawing.

## 28 46 23 – Fire Alarm Notification Appliances

- 1. All notification appliances shall be of a manufacture approved by RIT Facilities Management Services (FMS).
- 2. **All** Visual Notification Appliances will be synchronized with all others in a given area.
- 3. **All** Visual Notification Appliances shall be Addressable 2 Wire Type.
- 4. **All** peripheral devices shall be powered from the building emergency power circuit and battery backed.
- 5. **All** Horns shall be Addressable 2 Wire Type.
- 6. If addressable notification appliances cannot be used, then horns and strobes shall be on separate class-A circuits.
- 7. **All** Notification Appliances placed outside shall be Weather Proof and be placed in a STI-1229-HAZ weather proof enclosure.
- 8. Notification device installed on exterior of building at FDC shall be a strobe unit only (enclosed in a STI-1229-HAZ) to indicate water flow only, not general alarm.
- 9. **All** Notification Appliance Circuits (NAC) POWER EXTENDERS shall be approved by FACP manufacturer, support full monitoring and meet all NFPA requirements.
- 10. **All** NAC Power Extenders shall be installed next to the main FACP, all other installation locations must be approved by FMS.
- 11. **All** NAC Power Extenders must be connected to E-Power Source.
- 12. **All** NAC Power Extenders shall be monitored by an assigned individual addressable monitoring point for each extender with descriptive annunciation programmed for that device on the main FACP and remote LCD annunciator displays, and networked command centers (NCC).
- 13. Installation, hardware, and programming shall support all functions associated with a walk test. During a walk test, horn and strobe functionality shall be supported while testing devices using the walk test with signal feature. Devices and wiring methods that do not support testing in walk test mode with a signal having full functionality of that feature are **NOT** acceptable.
- 14. **All** NAC Power Supplies shall be Addressable and Wired Class A.
- 15. Do not use Wheelock Snap Series Z Strobes (unless approved by RIT Fire Alarm Shop).

16. No T Tapping.
17. On systems with voice, avoid speaker placement in individual offices.
18. No ceiling mounted strobes, unless approved by RIT Director of Engineering.
19. Strobes shall be wall mounted between 82 and 96 inches AFF. Generally strobes have the lens at 84 inches AFF.

## **28 47 00 – Mass Notification**

1. Products
  - a. Alertus Alert Beacons; POE; yellow
    - i. One beacon can feed up to two marquees
    - ii. Battery backup provided by RIT Public Safety
  - b. Alertus LED Marquees
2. Installation
  - a. RIT Public Safety will provide location plans to the Design consultants during the design development phase.
  - b. Marquees shall not obstruct or interfere with clearances of other life-safety devices when installed.

## **28 49 17 – Electronic Personal Safety Emergency Aid Devices**

1. General
  - a. RIT shall purchase, install, and program all products.
  - b. Contractor shall provide a dedicated, unswitched power outlet for the high-power repeater (EN5040-T). An outlet within an electrical room is preferred.
2. Products
  - a. Control panel: B5512 IP control panel, 48 points
  - b. Belt-clip pendant: EN1235S
  - c. Fixed position hold up transmitter: EN1235SF (preferred over the belt-clip pendant)
  - d. High-power repeater with transformer: EN5040-T
  - e. Security only serial receiver: EN42000

## Appendix 1 – SIMPLEX Fire Alarm Wire Specifications (reference RIT wire chart for compatible wire)

FIRE ALARM WIRE SPECIFICATIONS			
A	AUXILIARY POWER CIRCUIT - 2 CONDUCTOR 14 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454718RE AREA=0.0380 SQ. INCH	CONDUIT ONLY: THHN PAIGE 454314BR #14 AWG TP (BLACK/RED) AREA=0.0394 SQ. INCH	PLENUM RATED: FPLP PAIGE 454719ARE AREA=0.0333 SQ. INCH
B	RUI/N2 COMMUNICATION - 1 PAIR 18 AWG TWISTED OVERALL NON-PLENUM RATED: FPL PAIGE 454722AREM AREA=0.0224 SQ. INCH		SHIELD PLENUM RATED: FPLP PAIGE 454717ARE AREA=0.0219 SQ. INCH
D	DOOR HOLDER CIRCUIT - 2 CONDUCTOR 14 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454718RE AREA=0.0380 SQ. INCH	CONDUIT ONLY: THHN PAIGE 454314BR #14 AWG TP (BLACK/RED) AREA=0.0394 SQ. INCH	PLENUM RATED: FPLP PAIGE 454719ARE AREA=0.0333 SQ. INCH
E	RS-232 - 1 PAIR 18 AWG TWISTED OVERALL SHIELD NON-PLENUM RATED: FPL PAIGE 454722AREM AREA=0.0224 SQ. INCH		PLENUM RATED: FPLP PAIGE 454717ARE AREA=0.0219 SQ. INCH
H	AUDIBLE CIRCUIT - 2 CONDUCTOR 14 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454718ARE AREA=0.0380 SQ. INCH	CONDUIT ONLY: THHN (2) #14 AWG (RED/BLACK) AREA=0.0097 SQ. INCH	PLENUM RATED: FPLP PAIGE 454719ARE AREA=0.0333 SQ. INCH
K	REMOTE TEST SWITCH/LED CIRCUIT - (2) 2 CONDUCTOR 18 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454703ARE AREA=0.0204 SQ. INCH	CONDUIT ONLY: TFFN (2) #18 AWG (PINK/BROWN) (2) #18 AWG (WHITE/ORANGE) AREA=0.0055 SQ. INCH (EACH)	PLENUM RATED: FPLP PAIGE 454709ARE AREA=0.0165 SQ. INCH
L	REMOTE LED CIRCUIT - 2 CONDUCTOR 19 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454703ARE AREA=0.0204 SQ. INCH	CONDUIT ONLY: TFFN (2) #18 AWG (WHITE/ORANGE) AREA=0.0055 SQ. INCH	PLENUM RATED: FPLP PAIGE 454719ARE AREA=0.0333 SQ. INCH
M	MAPNET/IDNET CIRCUIT - 1 PAIR 18 AWG TWISTED OVERALL NON-PLENUM RATED: FPLR PAIGE 454722AREM AREA=0.0224 SQ. INCH		SHIELD PLENUM RATED: FPLP PAIGE 454717ARE AREA=0.0219 SQ. INCH
N	RS-485 COMMUNICATION TRUNK - 1 PAIR 18 AWG TWISTED OVERALL SHIELD NON-PLENUM RATED: FPL PAIGE 454722AREM AREA=0.0224 SQ. INCH		PLENUM RATED: FPLP PAIGE 4454717ARE AREA=0.0219 SQ. INCH
P	MAPNET/IDNET POWER CIRCUIT - 2 CONDUCTOR 14 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454718RE AREA=0.0380 SQ. INCH	CONDUIT ONLY: THHN PAIGE 454314BR #14 AWG TP (BLACK/RED) AREA=0.0394 SQ. INCH	PLENUM RATED: FPLP PAIGE 454719ARE AREA=0.0333 SQ. INCH
R	RELAY CIRCUIT - 2 CONDUCTOR 14 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454718RE AREA=0.0380 SQ. INCH	CONDUIT ONLY: THHN PAIGE 454314BR #14 AWG TP (BLACK/RED) AREA=0.0394 SQ. INCH	PLENUM RATED: FPLP PAIGE 454719ARE AREA=0.0333 SQ. INCH
S	SPEAKER CIRCUIT - 1 PAIR 18 AWG TWISTED OVERALL SHIELD NON-PLENUM RATED: FPL PAIGE 454722AREM AREA=0.0224 SQ. INCH		PLENUM RATED: FPLP PAIGE 454717ARE AREA=0.0219 SQ. INCH
T	TELEPHONE CIRCUITS - 1 PAIR 18 AWG TWISTED OVERALL SHIELD NON-PLENUM RATED: FPL PAIGE 454722AREM AREA=0.0224 SQ. INCH		PLENUM RATED: FPLP PAIGE 454717ARE AREA=0.0219 SQ. INCH
V	VISUAL/SIGNAL CIRCUIT - 2 CONDUCTOR 12 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454720ARE AREA=0.0547 SQ. INCH	CONDUIT ONLY: THHN (2) #12 AWG (RED/BLACK) AREA=0.0133 SQ. INCH (EACH) ***** REFER TO SIGNAL CIRCUIT DISTANCE CHART *****	PLENUM RATED: FPLP PAIGE 454725ARE AREA=0.0468 SQ. INCH
V	ADDRESSABLE VISUAL/SIGNAL CIRCUIT - 2 CONDUCTOR 12 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454720ARE AREA=0.0547 SQ. INCH		PLENUM RATED: FPLP PAIGE 454725ARE AREA=0.0468 SQ. INCH
Z	ZONE CIRCUIT - 2 CONDUCTOR 18 AWG SOLID NON-PLENUM RATED: FPLR PAIGE 454703ARE AREA=0.0204 SQ. INCH	CONDUIT ONLY: TFFN (2) #18 AWG (YELLOW/BLUE) AREA=0.0055 SQ. INCH (EACH)	PLENUM RATED: FPLP PAIGE 454709ARE AREA=0.0165 SQ. INCH

## Appendix 2 – RIT Fire Alarm Wire Specifications

REPLACE SIMPLEX RECOMMENDATION	NUMBER OF CONDUCTORS	INSULATOR COLOR	SHIELD and DRAIN	JACKET and COLOR	TYPE / RATING	SUPPLIERS CONTACT INFORMATION
(1) USE IN PLACE OF “B,E,N, and M” LISTED IN SIMPLEX WIRE SPECIFICATION MAPNET/IDNET WIRE	#18/2 STRANDED COPPER TWISTED	(1) RED (1) BLACK	FOIL SHIELD STRANDED DRAIN	POLYFIN OR EQUIV RED JACKET	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
(2) USE IN PLACE OF (1) OPTIONAL LISTED IN SIMPLEX WIRE SPECIFICATION MAPNET/IDNET WIRE	#16/2 STRANDED COPPER TWISTED	(1) RED (1) BLACK	FOIL SHIELD STRANDED DRAIN	POLYFIN OR EQUIV RED JACKET	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
(3) USE IN PLACE OF “V” LISTED IN SIMPLEX WIRE SPECIFICATION VISUAL APPLIANCE CIRCUIT WIRE	#14/2 STRANDED COPPER TWISTED	(1) RED (1) BLACK	UNSHIELDED	POLYFIN OR EQUIV RED JACKET/WITH YELLOW STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
(4) USE IN PLACE OF (3) OPTIONAL LISTED IN SIMPLEX WIRE SPECIFICATION VISUAL APPLIANCE CIRCUIT WIRE	#12/2 STRANDED COPPER TWISTED	(1) RED (1) BLACK	UNSHIELDED	POLYFIN OR EQUIV RED JACKET/WITH YELLOW STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
(5) USE IN PLACE OF “D” LISTED IN SIMPLEX WIRE SPECIFICATION DOOR HOLDER CIRCUIT WIRE	#14/2 STRANDED COPPER TWISTED	(1) ORANGE (1) BROWN	UNSHIELDED	POLYFIN OR EQUIV RED JACKET/ WITH BROWN STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
(6) USE IN PLACE OF “A, and P” LISTED IN SIMPLEX WIRE SPECIFICATION AUXILIARY POWER CIRCUIT WIRE	#14/2 STRANDED COPPER TWISTED	(1) WHITE (1) BLACK	UNSHIELDED	POLYFIN OR EQUIV RED JACKET/ WITH WHITE STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza



<b>(7)</b> USE IN PLACE OF <b>"S"</b> LISTED IN SIMPLEX WIRE SPECIFICATION SPEAKER CIRCUIT WIRE	#18/2 STRANDED COPPER TWISTED	(1) YELLOW (1) BLUE	FOIL SHIELD STRANDED DRAIN	POLYFIN OR EQUIV RED JACKET / WITH BLUE STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
<b>(8)</b> USE IN PLACE OF <b>"H"</b> LISTED IN SIMPLEX WIRE SPECIFICATION AUDIO (HORN) CIRCUIT WIRE	#14/2 STRANDED COPPER TWISTED	(1) YELLOW (1) BLUE	UNSHIELDED	POLYFIN OR EQUIV RED JACKET/ WITH BLACK STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
<b>(9)</b> USE IN PLACE OF <b>"V"</b> LISTED IN SIMPLEX WIRE SPECIFICATION VISUAL / SIGNAL CIRCUIT WIRE	#14/2 STRANDED COPPER TWISTED	(1) RED (1) BLACK	UNSHIELDED	POLYFIN OR EQUIV RED JACKET/WITH YELLOW STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
<b>(10)</b> USE IN PLACE OF <b>"K"</b> LISTED IN SIMPLEX WIRE SPECIFICATION REMOTE TEST STAT	18/4 STRANDED COPPER TWISTED	(1)PINK (1)BROWN (1)WHITE (1)ORANGE	UNSHIELDED	POLYFIN OR EQUIV RED JACKET/WITH GRAY STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
<b>(11)</b> USE IN PLACE OF <b>"L"</b> LISTED IN SIMPLEX WIRE SPECIFICATION REMOTE LED	18/2 STRANDED COPPER TWISTED	(1)WHITE (1)ORANGE	UNSHIELDED	POLYFIN OR EQUIV RED JACKET/WITH GRAY STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
<b>(12)</b> USE IN PLACE OF <b>"R"</b> LISTED IN SIMPLEX WIRE SPECIFICATION RELAY CIRCUIT	18/2 STRANDED COPPER TWISTED	(1) WHITE (1) BLACK	UNSHIELDED	POLYFIN OR EQUIV GRAY JACKET/WITH RED STRIPE	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191 Direct Fax# 603-633-4910 Salesman, Joe Pellizza
<b>(13)</b> USE IN PLACE OF <b>"Z"</b> LISTED IN SIMPLEX WIRE SPECIFICATION ZONE CIRCUIT	18/2 STRANDED COPPER TWISTED	(1)WHITE (1)BLUE	UNSHIELDED	POLYFIN OR EQUIV RED JACKET/WITH	FPLP	WINDY CITY WIRE COMPANY PHONE: 1-800-379-1191

				PURPLE STRIPE		Direct Fax# 603-633-4910 Salesman, Joe Pellizza
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*\*All wire listed above is custom manufactured by Windy City Wire Company and will require 5000ft minimum order per item.*  
*In addition, a (2) week lead time for production is required for all custom manufactured orders.*

*\*\* Please specify maximum allowable capacitance per foot when ordering.*

*\*\*\*All wire must be fire rated stranded cable.*

END OF DIVISION 28