FIRE ALARM SYSTEM SUBMITTAL REQUIREMENTS

These guidelines have been developed by a consensus process of interested parties; made up of AHJ's, design engineers, and industry representatives. The guidelines are designed to provide a uniform standard of minimum requirements for plan submittals.

By providing the necessary information to the reviewing authority, it is the intent of this document to provide an efficient and appropriate turnaround of the plans submitted. It is understood that all fire alarm systems will not require all the information listed below. However, plans may not be accepted (or the review may be delayed) if items, specific to the plans being submitted, are not included.

1.0 Qualifications and Responsibilities:

1.1. Shop drawings must be prepared and signed by a minimum of a NICET Fire Alarm Level III certified individual.

1.2. Shop drawings must be reviewed by the Engineer of Record (Colorado Registered Professional Engineer) as defined by CRS 12 -25-102 and approved for conformance with the design concept and all applicable codes and standards. The submittal shall provide evidence of such review (e.g.. review stamp or review letter).

2.0 Shop Drawings: All Sheets

2.1. must be clear, legible and bound.

2.2. must be the same size. Sheets are to be a maximum size of 24" x 36" (ANSI C).

2.3. must conform to a consistent scale (minimum acceptable scale is 1/8" = 1'-0") except site plan.

2.4. must have the sheet number, revision and date indicated in the title block.

2.5. must include the name and address of the project indicated in the title block.

2.6. must include the name and address of the installing contractor indicated in the title block.

2.7. that show *The Prepared by* section shall include designer's name, NICET certification sub-field, level, number and expiration date indicated in the title block. Designer may be required to provide evidence of certification upon request of the AHJ.

2.8. that include *The Reviewed by* section shall include Engineer of Record's name and associated Colorado professional engineering license number indicated in the title block. Engineer of Record may be required to provide credentials upon request of the AHJ.

2.9. must indicate verified compass points.

2.10. must include a title (i.e First Floor Plan).

2.11. must include a key plan for building sections that identifies the area of work. Match lines are to be used when a single floor plan is shown on multiple sheets.

2.12. must include a legend for plan symbols used. Legend must be specific to system and only include applicable devices. (NFPA 170 symbols are preferred)

3.0 Title Sheet: The following items shall be clearly indicated on the title sheet

3.1. Name and address of the building owner.
3.2. Name and telephone number of the installation contractor.
3.3. Name, address and telephone number of the general contractor (if applicable).
3.4. Name, address and telephone number of the electrical contractor (if applicable).
3.5. Name, address and telephone number of the designer of record.
3.6. Name, address and telephone number of the engineer of record.
3.7. Square footage for each building and total square footage for the project.
3.8. Building occupancy type(s).
3.9. Scope of work is to be indicated in narrative format.
3.10. Type of system is to be indicated, i.e.: conventional hardwired, wireless, addressable, analog addressable; circuit Class and Styles are to be provided for each circuit (i.e. SLC: Class A, Style 6, etc.).
3.11. Provide a list of all applicable codes and standards, with Editions, used in the system design (Building Code, Fire Code, Mechanical Code, Elevator Code, NFPA 72, NFPA 70, Local Amendments, etc.). Note: This information should be obtained from the engineer of record.
3.12. Provide a list of all other approving agencies (i.e. UL, FM, etc.) applicable to the project.
3.13. Provide a sequence of operation (input/output matrix) in compliance with the NFPA 72 Annex material. The information provided in the sequence of operation must be specific to the project. Generic sequence of operations will not be accepted.
3.14. Identify if wiring is enclosed in conduit, open wiring, plenum wiring, power limited or non-power limited.
3.15. Identify the type of system, i.e. Central, Remote, Proprietary, etc.
3.16. Identify the type of audible notification: temporal, steady, coded, voice, etc.
3.17. Identify the type of visual notification: public or private mode.
3.18. Provide a wiring legend specific to types used for the project.
3.19. Provide an equipment list with manufacturer, part number, back box and symbol used to identify the component. If there is insufficient space for wiring legend, equipment list and symbol legend on the title sheet, than insert an additional sheet.

4.0 Site Plan (may be included on Title Sheet)

4.1. Overall site layout including adjacent streets.
4.2. Scale of site plan.
4.3. Scale bar graph of site plan.
4.4. Location, number and/or address of each building.
4.5. Location of main control and all sub panel(s).
4.6. Location of annunciator location(s), if applicable.
4.7. Location of wiring between buildings, if applicable.
4.8. Location of cabinet for permanent fire alarm records.

5.0 Floor Plan Sheets: The following items shall be clearly indicated on the Floor Plan Sheets

5.1. Building floor plan with proper floor name.
5.2. Location of all doors, windows and walls (exterior and interior). Show all rated walls.
5.3. Location of all obstructions exceeding six feet above finished floor.
5.4. Intended use of each room (e.g. storage, classroom, restroom, vestibule, etc.).
5.5. Ceiling heights, ceiling details and configuration. This information may be shown on an additional sheet (with reference key to each unique area).
5.6. Reflected ceiling details for all areas when devices and/or appliances are installed on the ceiling.
5.7. Location of main control panel, sub panels, power booster panels, annunciators, etc.

5.8. Location of associated branch circuit panels for all fire alarm system components.
5.9. Location of all detection devices and notification appliances along with temperature ratings and candela ratings.
5.10. Location of all ancillary components, i.e. door hold open devices, fuel shut off solenoid, interconnected HVAC fans and associated control equipment, interconnected fire/smoke dampers and associated control equipment, interconnected elevator control equipment (i.e. shunt trip, recall, etc.) and all other interconnected equipment and components.
5.11. Location of all fire sprinkler risers, waterflow switches and tamper switches.
5.12. Location of all fire pumps and controllers.
5.13. Location of all remote alarm indicators.
5.14. Location of zone boundaries, if a conventional system.
5.15. Show approximate circuit layout including number of conductors.
5.16. Show all adjacent devices or appliances and rooms for tenant improvement work.

6.0 Riser Diagram:

6.1. Complete riser diagram showing all devices by floor/area as connected to the circuit, device addresses, wire color coding schedule, wire count, wire type and conduit fill with calculations shown.

7.0 Details Sheet:

7.1. Circuit wiring diagram.
7.2. Device/appliance mounting height profile.
7.3. Typical device and ancillary device wiring.
7.4. The interface of fire safety control functions.

8.0 Voltage Drop Calculations:

8.1. Provide Voltage drop calculations for each circuit showing wire size, circuit load and voltage drop.
8.2. Provide Audio circuit power loss calculations. Voltage drop calculations must be performed using the output circuit voltage when the input voltage to the control panel is 85% of it's name plate voltage and the maximum current draw of all devices and notification appliances is to be used.
8.3. Provide resistance values with supporting data sheets or provide NEC values and reference.
8.4. Indicate method used and show all formulas/equations.

9.0 Stand-by Battery Calculation:

9.1. Provide Stand-by battery calculations for each control panel, sub panel, monitoring station transmitter, power supply or any component requiring secondary power.

10.0 Specification Package

10.1. Table of Contents. Provide tabs for each section. Sections are to be as follows:
10.1.1. Control panels, power supplies and annunciators.
10.1.2. Initiating devices.
10.1.3. Notification appliances.
10.1.4. Other system components, modules and relays.
10.1.5. Compatibility listings (matrix, table, or information showing device compatibility).
10.1.6. Fire department operating instructions for entire system (this includes a copy of the instructions that will be posted adjacent to the control panel).
10.1.7. Manufacturer approved testing instructions.

Comment [JAM1]: Added language to indicate that voltage drop calcs must be in accordance with NFPA 72, i.e. start at the output voltage of the circuit when the input voltage to the control panel is only 85%. I required that the maximum current draw of all devices and notification appliances is to be used. This is somewhat complicated because a strobe draws more current at 16 volts whereas a horn draws more current at 33 volts. To be completely compliant with NFPA 72, a voltage drop calc would need to be performed at both 85% and 110%, with devices/appliances operating at 16 volts and 33 volts. However, under the new edition of UL 864 (effective October 2005), only the maximum current draw will be permitted to be included in the installation instructions. The language added here supports that change. Typically, the 85% or brown-out voltage would be worse case so the need to calculate the circuit at 110% would be unnecessary. Keep in mind that the value of 20.4 volts, typically used, may not reflect the actual output voltage of the NAC circuit when the input voltage to the panel is at 85%. Many people make the mistake that 85% of the input voltage equates directly to voltage output of 20.4 on the NAC circuit. In reality, the output of the NAC when the power supply is only receiving 85% of the normal input voltage is dependent on the electrical characteristics of the power supply or transformer.

11.0 Cabinet for Permanent Fire Alarm Records:

A cabinet for permanent fire alarm records is required to be installed in every new building with a fire alarm system and in existing buildings when a new fire alarm system is installed. The cabinet for permanent fire alarm records is to be located adjacent to the fire alarm control panel, or as approved by the Authority Having Jurisdiction.

11.1. The cabinet is required to meet the following specifications:
- 11.1.1. Be of durable construction.
- 11.1.2. Lockable and keyed the same as the control panel.
- 11.1.3. Marked in contrasting letters, "Permanent Fire Alarm System Records Do Not Remove".

11.2. The cabinet is required to contain the following:
- 11.2.1. Complete set of as-built drawings, as well as system modification drawings.
- 11.2.2. A copy of all permits.
- 11.2.3. A copy of the NFPA Record of Completion.
- 11.2.4. A copy of the original test printout.
- 11.2.5. A hard copy print out of the system configuration, if the system is software driven.
- 11.2.6. A complete copy of the operating instructions for the entire system.
- 11.2.7. A copy of all equipment submittals/specifications.
- 11.2.8. A copy of the voltage drop calculations for all circuits.
- 11.2.9. A copy of the system stand-by battery calculations for all panels.
- 11.2.10. A copy of all testing and inspection forms.
- 11.2.11. Proof of Owner obtained ITM contract.

Short Format Submittal Criteria for Existing Systems

12.0 *Short Format* is for the addition, modification or relocation of up to a maximum of 10% of the total number of initiating devices or notification appliances, not to exceed five devices. The following items shall be clearly indicated in the Short Form Submittal Package.

12.1. Minimum drawing sheet size to be 8 ½" by 11".
12.2. Minimum acceptable scale is 1/8" = 1'-0".
12.3. Minimum acceptable text height is 1/8"
12.4. Project name
12.5. Location (address, suite, etc.) .
12.6. Contractor name, address and phone number.
12.7. Provide narrative scope of work.
12.8. Provide square footage of the project area.
12.9. Provide a graphical scope of work (i.e. cloud the area(s) of work).
12.10. Provide a key map showing the location of the respective project within the building/site (not required to be to scale).
12.11. Show location of all fire alarm initiating devices and notification appliances with temperature and candela ratings, when applicable.
12.12. For tenant improvements, show all adjacent devices and rooms.
12.13. Provide symbol legend specific to devices used. (NFPA 170 symbols are preferred)
12.14. Wire/cable specifications (size, type, etc.)
12.15. Statement of compatibility and supporting documentation for new and existing devices.
12.16. End of line voltage readings for existing notification circuits being modified.

12.17. Installation/data sheets.
[If data sheets for existing equipment are not available, provide the following:
- Voltage limits of existing and new devices on circuits affected.
- Amperage readings for each circuit from their respective power supplies.
- Ampacity limits for power supplies (per circuit and total).

12.18. Wiring Class and Style of circuits.

ALL OF THE ABOVE INFORMATION SHALL BE SUBMITTED AS A COMPLETE DOCUMENT SET FOR APPROVAL. DOCUMENT SUBMITTALS THAT DO NOT MEET THESE MINIMUM STANDARDS MAY NOT BE ACCEPTED OR MAY BE RETURNED FOR CORRECTION. APPROVED DOCUMENTS MUST BE KEPT ON SITE DURING CONSTRUCTION.