

Expectations of Professional Engineer's for Fire Protection Bid Documents

In order to clarify expectations of this jurisdiction with regards to design, bid, and installation drawings for fire protection systems, this jurisdiction has established the following guidelines. These guidelines are based on the white paper "SFPE/NSPE/NICET Joint Position on the Engineer and the Engineering Technician Designing Fire Protection Systems" available on the web site of the National Society of Professional Engineers, www.nspe.org. This coincides with Position Statement #25 by the National Council of Examiners for Engineering and Surveying (NCEES).

Throughout the codes, construction tradeoffs are being allowed based on various fire protection features. The performance of suppression systems and voice evacuation systems has become very dependent on the particular hazards and emergency response plans for a respective facility. As a result, the integration and complexity of these systems requires oversight of the registered design professionals. Therefore, as identified, the respective engineers will be responsible for review and acceptance of contractor installation drawings along with site inspection/verification of system compliance to engineer performance criteria.

Preparation of installation drawings for fire protection systems based on prescriptive criteria of the respective NFPA Standards does not require the services of an engineer. However, when a design professional is preparing bid / solicitation documents for a client as part of a design service/package, the engineer(s) shall include applicable information within this policy as a minimum for the respective systems. The engineer is responsible to ensure the final system will satisfy the best interests of their client, this jurisdiction, and applicable codes. The information shall be provided by a registered professional competent in the respective discipline. In accordance with state law, the engineer shall place his/her seal on the respective design documents containing the following information.

Fire Alarm and Emergency Communication Systems:

1. Identify scope of work
2. Identify applicable codes and standards
3. Identify occupancy type and specific criteria for the respective occupancy
4. Identify fire / smoke resistive assemblies for penetrations
5. Type of system and components (horns, voice, addressable, conventional, networked, etc.)
6. Identify panel locations (ensuring adequate space and clearance for anticipated panels (main panel, voice panel, booster panels, strobe panels, etc.)
7. Creation of concept riser showing intent of system and integration of other systems
8. Identification of interface(s) required with fire safety functions (HVAC, access control, door hold-open, smoke control, elevators, etc.)
9. Identify average ambient sound levels for basis of design
10. Identification of Acoustically Distinguishable Spaces per NFPA 72
11. Architect/Engineer are to address acoustic needs to ensure speech intelligibility can be achieved for voice systems

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12. Identification of where visual notification is required and appropriate candela ratings for the spaces
13. Identification of all initiating device locations (pull stations, smoke detectors, suppression system monitoring, etc.)
14. Pathway / circuit survivability (circuit class, fire resistance, conduit, etc.)
15. Wire types to be used (plenum, non-plenum, fire resistive)
16. Any specific performance based criteria, risk analysis, insurance requirements, client corporate requirements, etc.
17. Oversight of risk analysis and specific performance criteria for mass notification systems when applicable
18. Provisions for electrical 120AC circuits at each panel, and loading
19. Engineer Review and Inspection: This section applies to any system incorporating voice notification, performance alternatives, occupancies over 4 stories, or protected building/areas over 23,000 square feet.
 - a. The engineer of record shall review and accept contractor installation shop drawings, calculations, and data sheets prior to submittal to this jurisdiction. Documentation indicating acceptance by the engineer shall be provided with jurisdiction submittal. This is to ensure that the installation submittals are in compliance with performance and code expectations established by the engineer of record in contract documents. To ensure there are no delays, these submittals should be prepared early in the project.
 - b. The engineer of record or designee shall field inspect the final installation. Physically inspect and test system performance (including integrated systems) to applicable design documents and codes prior to scheduling final inspection by this jurisdiction. A document signed by the engineer of record shall be provided to the jurisdiction indicating the results and acceptance of the test(s).

Water Based Suppression Systems:

1. Identify scope of work
2. Identify applicable codes and standards (IBC, NFPA 13, 13D, 13R, 14, 24, etc.)
3. Identify if allowable area, height, or other construction credits have been taken based on the type of system (such as 13, 13D, 13R)
4. Identify occupancy type and specific criteria for the respective occupancy
5. Identify fire / smoke resistive assemblies for penetrations
6. Type of system and components (wet, pre-action, dry-pipe, air/nitrogen compressor, single-interlock, double-interlock, etc.)
7. Backflow requirements per local authority (type, location, testing provisions)
8. Location of supply entry, riser location, and clearance around riser
9. Identify locations requiring heat/insulation (coordinate with other trades)
10. Classification of the commodities to be protected
11. Density, flow, and design area size
12. Inside and outside hose demands

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13. Determine and confirm available water supply. Provide flow test results and duration available/required.
14. Preliminary layout and hydraulic calculations to verify adequacy of proposed water supply
15. Evaluate available fire flow for fire hydrants per IFC, standpipes per NFPA 14, suppression system per NFPA 13. Standpipes and hydrants are often more demanding.
16. Identify provisions for secondary containment of suppression water and chemicals when applicable
17. Seismic requirements based on site and soil conditions (usually obtained from structural engineer or geotechnical report)
18. Analysis to identify concerns regarding systems structural support (as appropriate)
19. Analysis to identify any concerns with water quality that could affect proposed system (as appropriate)
20. Engineer Review and Inspection: This section applies to any system incorporating K-factors greater than 11, high piled / rack storage, foam, performance alternatives, occupancies over 3 stories, or protected building/areas over 23,000 square feet.
 - a. The engineer of record shall review and accept contractor installation shop drawings, calculations, and data sheets prior to submittal to the jurisdiction. Documentation indicating acceptance by the engineer shall be provided with jurisdiction submittal. This is to ensure that the installation submittals are in compliance with performance and code expectations established by the engineer of record in contract documents. To ensure there are no delays, these submittals should be prepared early in the project.
 - b. The engineer of record or designee shall field inspect the final installation. Physically inspect and verify performance criteria to applicable design documents and codes prior to scheduling final inspection by this jurisdiction. A document signed by the engineer of record shall be provided to the jurisdiction indicating the results and acceptance of the system(s).

Special Hazard Suppression Systems:

1. Identify scope of work
2. Identify applicable codes and standards
3. Identify occupancy type and specific criteria for the respective occupancy
4. Type of system and components (clean agent and type, dry-chem, foam, etc.)
5. Identify fire / smoke resistive assemblies for penetrations
6. Determination of design concentration for respective clean agent
7. Room construction and structural integrity
8. Construction and air-tightness of protected rooms for clean agent (to pass door fan tests and retain concentration)
9. Ventilation / Pressure relief, dampers, controls, HVAC shut down, etc.
10. Audible and visual notification and spacing in accordance with NFPA 72 for area(s)

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11. Temperatures of protected space and cylinder storage location
12. Identify panel location
13. Identify cylinder locations
14. Provide adequate information to calculate volumes of protected spaces
15. Identification of spaces to be protected (above ceiling, below floors, local, total flooding, etc.)
16. Identify detection systems, manual activation, abort, emergency power off systems, etc.
17. Identify system interface with other equipment including concept riser showing interface

Underground Utilities, Fire Roads, Turning Radius, Hydrant Spacing, Vehicle Loads:

1. Identify scope of work
2. Identify applicable codes and standards (shall comply with adopted fire code)
3. Identify spacing between hydrants, and from hydrant to most remote points of building, and spacing to other site hazards
4. Identify turning radius for emergency vehicle access, turn-around, dead-end distances, fire lanes, etc.
5. Identify fire vehicle access and interior fire lanes as necessary
6. Identify clearance heights under canopies, barriers, arches, etc.
7. Identify road widths, including fire lane signage based on respective road widths
8. Identify load ratings of roads to accommodate fire apparatus
9. Identify water main supplies, diameters, available fire flows for hydrants
10. Identify elevations and grades for vehicle access and/or building access
11. Identify any gates, width, provisions for fire department override/access.
12. Identify designated loading and unloading areas to ensure fire lanes and emergency vehicle access is not obstructed during daily delivery loading/unloading services as applicable