

DIVISION 21- FIRE SPRINKLER SYSTEMS

SECTION 21 00 00

INTRODUCTION

PART 1 – GENERAL

A. OVERVIEW

1. This guide line specification is for the Consulting Engineers and outlines minimum requirement for the District. The Consulting Engineer should apply these guidelines consistent with the budget constraints. The Consulting Engineer must select among the systems, size and specific equipment and materials within the budget and design limits. The guidelines are based upon considerable experience with the purpose of providing the best value for the available money.
2. The applicable provisions elsewhere in Division 21, 22 and 23 shall apply.
3. Related Requirements:
 - a. Basic Mechanical Regulations: Section 23 00 03
 - b. Basic Mechanical Materials and Methods: Section 23 00 04
 - c. Mechanical Noise and Vibration: Section 23 05 48
 - d. Mechanical Identification: Section 23 05 53
 - e. Mechanical Insulation: Section 23 07 00
 - f. Demonstrations: Section 23 05 95
 - g. System Starting: Section 23 05 97
 - h. Project Close-Out: Section 23 90 00

B. DESIGN

1. The Consulting Engineer is required to provide a complete and workable design. The Consulting Engineer is responsible and accountable for his/her work. If in the opinion of the Consulting Engineer any portion of these guideline specifications or system performance function will not be complied with, the Engineer will notify the District in writing.
2. Provide a complete operable system designed and installed in accordance with applicable local, state, federal and jurisdictional codes, enforcement agencies and insurance or underwriting agencies. Comply with NFPA 13. Systems shall be drainable with proper drainage devices and drain terminations to properly sized receptors within the building.
3. The Fire Protection Contractor shall be responsible for the final design, layout, all materials, equipment and labor for the complete, approved, and operational installation of the fire protection systems.
4. The Fire Protection Contractor shall be responsible for coordinating any interferences with other crafts and space limitations for the satisfactory installation of all fire protection piping and equipment.
5. For hydraulically designed systems, the hydraulic calculations shall accompany the working plans submitted and shall include a summary sheet, detailed work sheets and a graph sheet; per NFPA Standard 13. Margin of safety for available water flow and pressure shall be the greater of the following: System utilizing hydraulic calculations shall allow a 5 PSI loss in addition to all other losses or 10% (including the losses through water-service piping, valves and backflow preventers).

C. REQUIREMENTS OF REGULATORY AGENCIES

1. Requirements of Regulatory Agencies: Perform work in strict compliance with these Specifications and Drawings and all applicable codes, ordinances, standards, and statutes in effect at the building site. All deficiencies as noted by the local jurisdictional authorities shall be corrected. No extra charges will be allowed for these corrections.

- D. REFERENCED STANDARDS (MINIMUM CRITERIA)
1. Adhere to the most recent edition of the following publications, together with the latest revisions, supplements and amendments thereto:
 - a. Nations fire Protection Association (NFPA) Standards No. 13, 14, 20 and 24 of the latest Edition.
 - b. Underwriters Laboratories, Inc. (UL) Fire Protection Equipment List.
 - c. The International Building Code, latest edition.
 - d. The International Fire Code, latest edition.
 2. Listings: All fire protection equipment shall be listed by FM and Underwriters Laboratories, Inc., specifically for use in conjunction with fire protection system.
- E. Related Requirements:
1. Mechanical and Electrical Coordination: Section 23 05 01
 2. Basic Mechanical Requirements: Section 23 05 20
 3. Basic Mechanical Materials and Methods: Section 23 05 03
 4. Mechanical Identification: Section 23 05 53
 5. Testing, Adjusting and Balancing: Section 23 05 93
 6. Demonstrations: Section 23 05 95
 7. System Starting: Section 23 05 97
 8. Mechanical: Division 23 – All Sections
 9. General Requirements: Division 1 – All Sections
 10. Automatic Temperature Controls: Section 23 09 00
 11. Project Close-Out: Section 23 90 00
 12. Plumbing: Division 22 – All Sections
- F. DISTRICT REVIEW
1. The review of the documents by the District is intended to assist the Consulting Engineer to comply with the guideline specification. The District's review does not relieve the Consulting Engineer of the responsibility, accountability, completeness and workability of the design.
 2. Review Policy: Documents reviewed by the District shall be prepared in the form of redlined plans and annotated specification. These documents shall then be reviewed by the Consulting Engineer.
 3. Notification of the non-compliance: When any portion of the guideline specifications will not be met, the Consultant shall notify the School District in writing.

END OF SECTION

SECTION 21 13 00

FIRE PROTECTION

PART – 1 GENERAL

- A. SUMMARY – SECTION INCLUDES
 - 1. Sprinkler Piping and Specialties
 - a. Piping
 - b. Valving
 - c. Specialties
- B. REFERENCED STANDARDS (MINIMUM CRITERIA)
 - 1. Referenced Standards: Comply with applicable requirements of the following standards:
 - a. Refer Section 21 00 00.
- C. WORK INCLUDED
 - 1. The entire building shall be sprinklered. Sprinkler system shall consist of the following types: Wet and dry pre-action.
 - a. The zone which serves the exterior of the building shall be dry pre-action type.
 - b. Where approved by the Jurisdictional Fire Authority, heat tracing will be allowed in limited areas; coordinate and consult with district staff prior to specifying.
 - c. All other zones such as kitchen area, office area, crawl space and classroom shall be wet type.
 - d. Utilize dry type sprinklers in areas within the building subject to freezing temperatures (i.e. freezer/coolers within food service areas) where wet piping systems are otherwise to be installed.
- D. SUBMITTALS
 - 1. Provide Product Data for the following: Piping materials, pip hangers, supports and sprinkler specialty fittings, backflow prevention devices, valves, specialty valves and trim, sprinkler heads, escutcheons and guards, fire department connections, alarm devices with related electrical data.
 - 2. Fire Protection Contractor shall submit working plans to authorities having jurisdiction for review, approval and acceptance prior to commencing installation. No work shall commence until approvals are obtained. Working plans shall contain all information relative to the fire sprinkler system.
 - 3. The Fire Protection Contractor shall furnish the following at completions of his work:
 - a. Reproducible tracings of the approved final design layout “as-built”. Refer Section 23 90 00 for additional as- built drawing requirements.
 - b. Two (2) copies each of the Contractors Material and Test Certificates for aboveground and underground piping.
 - c. Two (2) copies each of “Owner’s Manuals” for fire protection equipment installed, covering operation, inspection, testing and maintenance of the equipment.
 - d. Two (2) copies of all hydraulic calculations.
- E. RELATED REQUIREMENTS
 - 1. Basic Requirements: Section 23 05 02
 - 2. Basic Materials and Methods: Section 23 05 03
 - 3. Mechanical Identification: Section 23 05 53
 - 4. Mechanical and Electrical Coordination: Section 23 05 01
 - 5. Project Close-Out: Section 23 90 00

- F. REQUIREMENTS OF REGULATORY AGENCIES
1. Requirements of Regulatory Agencies: Perform work in strict compliance with these Specifications and Drawings and all applicable codes, ordinances, standards, and statutes in effect at the building site. All deficiencies as noted by the local jurisdictional authorities shall be corrected. No extra charges will be allowed for these corrections.
 2. Adhere to the most recent edition of the following publications, together with the latest revisions, supplements and amendments thereto:
 - a. National Fire Protection Association (NFPA) Standards No. 13, 14 and 24.
 - b. Underwriters Laboratories, Inc (UL) Fire Protection Equipment List
 - c. The International Building Code
 - d. International Fire Code
 3. Where new drain terminations are required, extend new drainage discharge locations to adequate and appropriate points of collection within the building which extend and connect to the sanitary building drainage system.
 - a. Where new drain terminations cannot be extended to the sanitary building drainage system, coordinate locations of drain discharge with jurisdictional storm water departments to ensure exterior discharge to grade will be allowed.
- G. Listings: All fire sprinkler system equipment shall be listed by Underwriters Laboratories, Inc., specifically for use in conjunction with fire protection system.
- H. Certificates: Obtain and pay for all necessary permits before starting work. Obtain certificated, approvals and/or acceptances of all interested parties and authorities having jurisdiction.
- I. Certificate of Installation: Submit certificate upon completion of fire sprinkler system work, stating that the work has been completed and tested in accordance with the specified standards, and that there are no defects in the system and that it is operational.

PART 2 – PRODUCTS

- A. ACCEPTABLE MANUFACTURES
1. Valves: (Base Bid)
 - a. Nibco
 - b. Stockham
 - c. Watts Industries, Inc., Water Products Dev.
 - d. Grinnell Fire Protection
 - e. Victaulic Co. of America
 - f. Milwaukee
 - g. Mueller
 2. Fire Department Connections: (Base Bid)
 - a. Fire-End and Croker Corp
 - b. Potter-Roemer, Fire Protection Div.
 - c. Guardian Fire Equipment, Inc.
 3. Sprinklers: (Base Bid)
 - a. Sprinkler Corp
 - b. Star Sprinkler Inc.
 - c. Reliable Automatic Sprinkler Co., Inc.
 - d. Viking Corp.
 4. Alarm Devices
 - a. Grinnell Fire Protection
 - b. Potter+Electric Signal Company
 - c. Viking Corp.

5. Backflow Prevention Devices: (Base Bid)
 - a. Ames Fire and Waterworks.
 - b. Febco (Division of Watts)
 - c. Zurn-Wilkins
6. Combination Inspectors Test and Drain:
 - a. Grinnell Fire Protection
 - b. Victaulic Co. of America
7. Specialties
 - a. Potter Roemer, Fire Protection Div.
 - b. Fire-End and Croker Corp.
 - c. Guardian Fire Equipment, Inc.
 - d. Victaulic Co. of America
 - e. Notifier
 - f. Potter Electric Signal Co.
 - g. Wheelock, Inc.
 - h. Farr-Larm
 - i. Anvil International, Gruvlok.
8. Compressors
 - a. Acceptable Manufactures: (Base Bid)
 - 1) Nash
 - 2) Champion
 - 3) Ingersoll-Rand
 - b. Air Compressor Description: Provided compressor unit consisting of air cooled motor compressor, air receiver, aftercooler, spring isolator controls, and all necessary equipment.
9. Dry Pipe Valves
 - a. Gem
 - b. Viking
- B. PIPING
 1. Schedule 40, ASTM A 53 B, seamless: Thin wall piping with welded outlets or rolled grooved pipe will be acceptable, provided it is approved by Owner's insurance underwriter, NFPA, and local authority, and is listed for working pressures involved.
 - a. Where piping is exposed, fittings shall be weld-end or screwed; not grooved-end or roller grip.
- C. FITTINGS
 1. Sprinkler System Fittings:
 - a. 2" and smaller: 250lb. cast iron, screwed, ASTM A47.2.
 - b. 2" and larger: Weld neck or victulic fitting and couplings or approved equal may be used where listed for working pressures involved.
- D. GATE VALVES
 - a. 2" and smaller: Bronze, 250 PSI with solid bronze wedge, tapered seat, screwed ends and OS&Y rising steam.
 - b. 2" and larger: Iron body, bronze mounted, 250 PSI with solid wedge, tapered seat, OS&Y rising steam.
- E. CHECK VALVES
 1. 2" and Larger: Iron body, bronze mounted, 250 PSI with flanged ends and clapper discs as follows:
 - a. Bronze disc for water line entrance.
 - b. Composition or rubber faced disc for fire department connection.
- F. HANGERS

1. Provide hangers in accordance with section 23 05 03. Hangers shall be of type specifically approved for use in fire protection systems. C-type clamps shall not be used without retaining straps.
- G. FIRE DEPARTMENT CONNECTION
1. Fire department connection shall be of type, size, configuration, finish as scheduled, with hose threads to match that of local fire department. Furnish complete with check valves, caps, chains and appropriately branded plate.
 - a. Include Knox style locking cap where required by jurisdictional fire authority.
- H. SPRINKLERS
1. Standard automatic sprinklers of proper temperature rating, UL approved as follows:
 - a. Upright or pendant, factory brass finish in all areas where sprinkler piping is exposed (except where future ceilings are to be installed)..
 - b. Recessed pendant, satin chrome finish, with matching escutcheons in all rooms with suspended ceilings and where future ceilings are to be installed.
 - c. Dry Pendant, satin chrome finish, with matching escutcheons in all rooms with ceilings and exposed to freezing conditions.
 - d. Horizontal sidewall, satin chrome finish with matching escutcheons.
 - e. Extended coverage horizontal sidewall satin chrome finish with matching escutcheons.
 - f. Dry horizontal sidewall, factory bronze finish with wall escutcheon.
 - g. Provide wire guards on sprinkler heads in Mechanical Room.
- I. ELECTRIC ALARMS
1. Combination intermittent horn and flashing light alarm device, UL listed for outdoor use, mounted on exterior wall near fire department connection.
 - a. Coordinate specifications for horn and strobe with fire alarm system designer.
 2. Waterflow indicators in automatic sprinkler riser, Potter Roemer 6200 Series or approved equal.
 3. Tamper Switches:
 - a. Potter-Roemer Fig. 6220 or approved equal for OS&Y gate valves.
 - b. Potter-Roemer Fig. 6221 or approved equal for rising stem globe valves.
- J. BACKFLOW PREVENTION DEVICES
1. Preferred, Double Check Valve Assembly: UL listed of type, size, configuration and finish as scheduled with resilient seated inlet valves and test valves.
 2. Where specifically required by the Jurisdictional Water Department, Reduced Pressure Backflow Preventer: UL listed of type, size, configuration and finish as scheduled with resilient seated OS&Y gate valves.
 3. Backflow prevention devices shall be approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California.
 4. End Connections: Flanged, grooved or Threaded.
 5. Pattern: As required by special conditions; ensure valving is mounted no higher than 4'-0" above the surrounding finished floor.
 - a. Where devices are mounted higher than 4'-0" coordinate with district staff for serviceability requirements and service platform design.
- K. SPECIALTIES
1. General: UL listed with end connections matching piping and equipment connected to.

2. Escutcheons: Provide premanufactured trim rings at all pipe penetrations through walls, floors and ceilings exposed to view in finished spaces.
3. Waterflow indicators (flow switches): Vane type, 250 PSI rated, shaded pole double throw type 120V/1 PH/60HZ complete with adjustable retard element and tamper proof cover.
4. Tamper switches: Shaded pole single throw type, 120 V/1 PH/60HZ with tamper proof cover. Shall signal alarm when valve is not in full open position.
5. Alarm horn and light: Weatherproof construction, 115V/1 PH minimum 95 DBA at 10 foot: Position directly above fire department connection to signal water flow in the sprinkler system.

L. DRY PRE-ACTION

1. System Components
 - a. Deluge Valve.
 - b. Release Trim: Pneumatic actuator (diaphragm bypass), strainer, shuttle valve, release system air pressure gauge and valve, air supervisory pressure switch (release system).
 - c. Waterflow Alarm Trim: Water motor alarm, alarm pressure switch.
 - d. Riser valves: Water supply control valve, rubber seat check valve, system main drain valve.
 - e. System Air Supply Trim: System pressure gauge and valve, soft seat check valve, air supervisory pressure, switch (sprinkler system).
 - f. Deluge Valve Standard Trim: Test drain valve, auxiliary drain valve, drain cup, drip check, alarm test shut off valve, pressure operated relief valve, priming valve, emergency release, priming pressure gauge and valve, water supply pressure gauge and valve.
 - g. Air Supply Trim: Air maintenance device, relief valve, soft seat check valve, dehydrator, air supervisory pressure switch (air compressor), air compressor.

END OF SECTION