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FIRE PROTECTION BASIC MATERIALS AND METHODS (FIRE PROTECTION SECTION 1 OF 2)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe, fittings, valves, and connections for combination sprinkler and standpipe systems.

1.2 REFERENCES

A. ASME B16.1 – Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; The American Society of Mechanical Engineers.

B. ASME B16.3 – Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers.

C. ASME B16.4 – Gray Iron Threaded Fittings; The American Society of Mechanical Engineers.

D. ASME B16.5 – Pipe Flanges and Flanged Fittings; The American Society of Mechanical Engineers; (ANSI/ASME B16.5).

E. ASTM A 47/A 47M – Standard Specification for Ferritic Malleable Iron Castings.

F. ASTM A 53/A 53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

G. ASTM A 795/A 795M – Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.

H. NFPA 13 – Standard for the Installation of Sprinkler Systems; National Fire Protection Association.

I. NFPA 24 – Standard for the Installation of Private Fire Service Mains and Their Appurtenances; National Fire Protection Association.

J. NFPA 72 – National Fire Alarm Code.

K. NFPA 101 – Code for Safety to Life from Fire in Buildings and Structures.

L. 2018 International Fire Code (as adopted and amended by the Rules and Regulations of the Safety Fire Commissioner Chapter 120-3-3-04(3))

M. UL (FPED) – Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

N. UL 262 – Gate Valves for Fire-Protection Service; Underwriters Laboratories Inc..

O. Chapter 120-3-3 of the Rules of the Safety Fire Commissioner.

P. Georgia State Minimum Standard Building Code (International Building Code 2018 Edition, with Georgia State Amendments). NFPA Code, where more stringent, shall take precedence.

1.3 SUBMITTALS

A. Product Data: Provide manufacturers catalogue information. Indicate valve data and ratings.

B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

C. Project As-Built Documents: Record actual locations of components and tag numbering.

D. Operation and Maintenance Data: Include installation instructions and spare parts lists.

1.4 QUALITY ASSURANCE

A. Fire Protection
1. The Contractor expressly warrants that the company performing the installation of the fire protection systems has demonstrated proficiency in the installation, start-up and adjustment of such systems by the successful performance of work of the nature specified herein on at least 5 commercial or institutional buildings, each containing minimum of 10,000 ft2 of protected area or greater.
2. The Contractor further warrants that the aforesaid subcontractor has trained personnel, instruments, tools, and equipment to perform the installation specified.
3. The Contractor also warrants that the aforesaid installer has been in business performing services of the nature specified herein for at least five-years.
4. Provide a certificate of competency as issued by the Georgia State Fire Marshal's Office.

B. Conform to UL and FM requirements.

C. Valves: Bear UL and FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.

D. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Deliver and store valves in shipping containers, with labeling in place.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

1.6 EXTRA MATERIALS

A. Provide additional materials as provided in these specifications and by NFPA.

PART 2 PRODUCTS

2.1 GENERAL SYSTEM AND PRODUCT REQUIREMENTS

A. Sprinkler Systems: Conform work to NFPA 13.

B. Standpipe and Hose Systems: Conform to NFPA 14.

C. Welding Materials and Procedures: Conform to ASME Code.

D. Building is light hazard, ordinary hazard group, and extra hazard group. Pipe sizes shall be hydraulically calculated based upon flow test to be conducted by contractor.

E. Provide hydraulic calculations over the most remote 1500 square feet providing density required for hazard as indicated in NFPA 13. Minimum discharge pressure shall be 7.0 PSI. Minimum residual pressure at city water main in the street shall be 20.0 PSI. Provide 10.0 PSI minimum safety margin in hydraulic calculations at design point. Design area reduction per NFPA 13 is not allowed.

F. Basis of design: Contractor shall perform, or have performed, at the same time, a Fire Flow and Twenty Four Hour Static Test to assure flow equals or exceeds specified basis of design flow rate prior to preparing shop drawings, installing system or performing calculations. Prepare calculations based on confirmed flow data or basis of design flow data, whichever is lowest. Flow test shall be performed in accordance with NFPA 13 and Rules and Regulations of Safety Fire Commissioner, O.C.G.A. Chapter 120-3-3. Modify flow test pressures (static and residual), if pressure recorded in 24 hour test is lower than flow test pressures for one hour duration, to lowest hour test pressure.

G. No pipe shall be routed above electrical panels and equipment as required by National Electrical Code, on control side or beneath suspended mechanical equipment except where specifically required by Code, in which case, provisions shall be made for service access.

H. Inspectors test connection(s) shall discharge to the outside of the building in location(s) acceptable to the Architect.

I. Inside auxiliary drains, if needed, shall discharge in location(s) acceptable to the Architect.Drain and test connection piping, if in finished space, shall be installed concealed.

2.2 BURIED PIPING

A. Refer to Civil plans and specifications for piping type.

2.3 ABOVE GROUND WET SYSTEM PIPING

A. Steel Pipe: ASTM A 795 Schedule 10 or ASTM A 53 Schedule 40, black. Piping 2" and smaller shall be threaded. Piping 2 1/2" and larger shall be grooved with rigid couplings.
1. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings and ASME B16.4, threaded fittings.
2. Malleable Iron Fittings: ASME B16.3, threaded fittings and ASTM A 47/A 47M.
3. Mechanical Grooved Couplings: Rigid malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe. Reducing couplings are NOT allowed.

2.4 PIPE HANGERS AND SUPPORTS

A. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.

B. Hangers for Pipe Sizes 2-inches and Over: Carbon steel, adjustable, clevis.

C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

D. Vertical Support: Steel riser clamp.

E. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

F. Provide support for any vertical pipe 36" in length or greater except armovers. Provide supports 12'-0" O.C. maximum or at floor levels.

G. Threaded rods shall NOT be bent. Bending is permitted only in unthreaded sections of hanger rods. Bending shall occur as close to the hanger as possible. Provide a swivel assembly if required.

2.5 GATE VALVES

A. Up to and including 2 inches:
1. Manufacturers:
a. Nibco Scott; Product T-104-O
b. Jenkins; Product 275U
c. Hammond; Product 1B681
d. Stockham; Product B-133
e. Kennedy; Product Fig. 66
2. Bronze body, bronze trim, rising stem, handwheel, solid wedge or disc, threaded ends.

B. Over 2 inches:
1. Manufacturers:
a. Nibco Scott; Product F-607-OTS
b. Crane; Product 467
c. Jenkins; Product 825-A
d. Hammond; Product 1R1154
e. Stockham; Product G-634
f. Kennedy; Product Fig. 68
2. Iron body, bronze trim, rising stem pre-grooved for mounting tamper switch, handwheel, OS&Y, solid rubber covered bronze or cast iron wedge, flanged ends.

2.6 GLOBE VALVES

A. Bronze body, rubber disc, union bonnet, 174 W.W.P., threaded ends.

B. Up to and including 2 inches:
1. Manufacturers:
a. Nibco-Scott; Product KT-65.
b. Kennedy; Product 975D.
c. United; Product 125S.
d. Fairbanks; Product 4691-3.

2.7 ANGLE VALVES

A. Bronze body, rubber disc, union bonnet, 174 non-shock cold water, threaded ends.

B. Up to and including 2 inches:
1. Manufacturers:
a. Nibco-Scott; Product T-301-W.
b. Kennedy; Product 985D.
c. United; Product 126S.
d. Fairbanks; Product 4691-3.

2.8 BUTTERFLY VALVES: Not allowed.

2.9 CHECK VALVES

A. Iron body, U.L. Listed- F.M. Approved, swing type, bronze trimmed, bronze seat and disc, flanged ends.

B. Manufacturers:
1. Jenkins; Product 629
2. Crane; Product 375
3. Stockham; Product G-939
4. Mueller; Product A-2120-6
5. Kennedy; Product #126

2.10 INDICATOR POSTS

A. Cast iron base, top section, & cap; malleable iron wrench and locking device; steel stem; cast iron coupling; bronze target holder with aluminum "shut" and "open" targets; Underwriters Laboratories listed, and Factory Mutual approved; available for varying trench depth; and with adjustable depth features.

B. Manufacturers:
1. Kennedy Fig. Series 741.
2. Nibco NIP-1.
3. Stockham G-951.
4. Mueller A-20804.

2.11 UNDERGROUND GATE VALVES

A. 2 1/2-inch and larger, iron body, non-rising stem, bronze stem, iron mounted disc with bronze rings, cast iron 2-inch square operating nut, flange, ends, AWWA spec. C-500.

B. Manufacturers:
1. Kennedy Fig. 701X.
2. Nibco F-609.
3. Stockham G-635.
4. Mueller A-2075-20.
5. M & H Fig. 3067.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and foreign material, from inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Storage: All piping shall be stored above ground and protected to prevent dirt and debris from entering pipe.

3.2 INSTALLATION

A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13 and these specifications.

B. Install standpipe piping, hangers, and supports in accordance with NFPA 14.

C. Install post indicator valve (PIV) upstream of backflow device.

D. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

E. Install piping to conserve building space, to not interfere with use of space and other work.

F. Group piping whenever practical at common elevations.

G. All piping shall be installed above ceilings in a concealed manner except where no ceilings are present

H. Sleeve pipes passing through partitions, walls, and floors.

I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

J. Reducing Tees: Weld-on threaded outlet tees and Coupolet-300 by Bonney Forge Division of Energy Products Group, Central Sprink 701, "TEE-LET" 300 by Merit Manufacturing Corp., NAP300 by North Alabama Pipe Corp., F400 by Grinnell Corp. may be used for side outlet reducing tees more than two pipe sizes smaller than main. Discs shall be retrieved and connected to pipe at point of cutting. Cutting shall comply with NFPA 13, Chapter 6.5.2.9.

K. Couplings may be used on gridded systems at only one end of each gridded branch line or on 2 1/2" or larger riser nipple to 2" or smaller branch line to facilitate connection provided that the coupling is connected to piping by a cut groove. Rolled grooves are not acceptable.

L. Pipe Hangers and Supports:
1. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
2. Place hangers within 12 inches of each horizontal elbow.
3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
4. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

M. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.

N. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

O. Do not penetrate building structural members unless indicated.

P. Provide sleeves when penetrating floors and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.

Q. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

R. Die cut threaded joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.

S. Install valves with stems upright or horizontal, not inverted. Remove protective coatings prior to installation.

T. Provide gate valves for shut-off or isolating service. No valve shall be installed with the centerline, if horizontal, or wheel, if vertical, more than 9'-0" AFF.

U. Provide drain valves at main shut-off valves, low points of piping and apparatus.

3.3 CLEANING AND PROTECTION

A. All materials, equipment and mechanical rooms shall be cleaned prior to the Final Inspection.

B. Wash down and scrub clean all mechanical room floors, walls, equipment bases and equipment.

C. Paint equipment where finish has been damaged requiring retouching of finish to match factory finish.

D. Chipped or scraped paint shall be retouched to match original finish.

E. All dents and sags in equipment casing shall be straightened.

F. All equipment, pipe, pipe fittings and appurtenances shall be free of rust and stains prior to substantial completion.

3.4 FINISHING EQUIPMENT AND MATERIAL

A. Use paint systems specified in Division 9 for the substrates to be finished.

B. Paint shop-primed equipment.

C. Re-install electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

D. Paint all exposed pipes, unless otherwise indicated.

E. All ferrous fasteners and hanger supports not having a corrosion resistant plated finish shall be painted to prevent rust.

F. Paint all equipment, including that which is factory-finished, exposed to weather or to view on the roof and outdoors.

G. Paint all exposed un-insulated ferrous materials.

END OF SECTION

FIRE SUPPRESSION SPRINKLERS (FIRE PROTECTION SECTION 2 OF 2)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wet Type Sprinkler System

B. Dry-pipe sprinkler system.

C. System design, installation, and certification.

D. Fire department connections.

1.2 REFERENCES

A. NFPA 13 – Standard for the Installation of Sprinkler Systems; National Fire Protection Association.

B. NFPA 14 – Standard for the Installation of Standpipe and Hose Systems; National Fire Protection Association.

1.3 SUBMITTALS

A. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

B. Shop Drawings:
1. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components and accessories. Indicate system controls.
2. Submit shop drawings, product data, and hydraulic calculations to Fire Marshall for approval and to Architect for review. Submit to Architect prior to submitting to Fire Marshal. Submit proof of approval to the Architect.

C. Project As-Built Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations. Provide two (2) CD and three (3) paper copies of as-built drawings.

D. Manufacturer's Certificate: Certify that system has been tested and meets or exceeds specified requirements and code requirements. All certificates shall be signed by certificate holder.

E. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.

1.4 QUALITY ASSURANCE

A. Maintain one copy of referenced design and installation standard on site.

B. Conform to UL requirements.

C. Equipment and Components: Provide products that bear UL label or marking.

D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

B. Store piping off floor and out of elements. Provide cover for piping to prevent dirt and debris from entering piping. Piping and fittings shall be rust free when installed.

1.6 EXTRA MATERIALS

A. Provide extra sprinklers of type and size matching those installed, in quantity required by referenced NFPA design and installation standard.

B. Provide suitable wrenches for each sprinkler type.

C. Provide metal storage cabinet located at piping entrance to building.

PART 2 PRODUCTS

2.1 SPRINKLER SYSTEM REQUIREMENTS

A. Sprinkler System: Provide coverage for entire building.

B. Occupancy: comply with NFPA 13.

C. Water Supply: Contractor shall perform or have performed an NFPA-13 water flow test data and a 24 hour static pressure test. Adjust flow test to lowest pressure recorded by 24 hour test of one hour duration.

D. Interface system with building fire alarm system.

E. Provide fire department connections where indicated on FP and civil drawings.

2.2 SPRINKLERS

A. Tyco and affiliates, Automatic Sprinkler, Reliable, Viking.

B. All sprinklers installed shall be by the same manufacturer.

C. Contractor shall select temperature ratings in accordance with NFPA 13, paragraph 8.3.2.

D. Suspended Ceiling Type: Recessed pendant type with matching flush push on escutcheon plate.
1. Finish: Chrome plated.
2. Escutcheon Plate Finish: Chrome plated.
3. Quick response Glass bulb type temperature rated for specific area hazard.

E. Gypsum Board Ceiling Type: Concealed pendant type with matching push on escutcheon plate.
1. Finish: Brass.
2. Escutcheon Plate Finish: Enamel, Verify color with architect.

F. Exposed Area Type: Standard upright type.
1. Finish: Brass.
2. Fusible Link: Quick Response Fusible solder link type temperature rated for specific area hazard.

G. Sidewall Type: Standard horizontal sidewall type with matching flush push on two piece escutcheon plate.
1. Finish: Chrome plated.
2. Escutcheon Plate Finish: Chrome plated.
3. Quick Response Fusible solder link type temperature rated for specific area hazard.

H. Guards: Finish to match sprinkler finish.

2.3 PIPING SPECIALTIES

A. Dry Pipe Sprinkler Alarm Valve: Check type valve with divided seat ring, rubber faced clapper to automatically actuate water motor alarm and electric alarm, with accelerator; with test and drain valve.

B. Water Motor Alarm: Hydraulically operated impeller type alarm with aluminum alloy chrome plated gong and motor housing, nylon bearings, and inlet strainer. By same manufacturer as Alarm Valve.

C. Electric Alarm: Electrically operated chrome plated gong with pressure alarm switch.

D. Water Flow Switch: Vane type switch for mounting horizontal or vertical, with two contacts; rated 10 amp at 125 volt AC and 2.5 amp at 24 volt DC. Notifier, Simplex, Potter, Grinnell.

E. Tamper Switch: Switch designed for installation on indicator valves with cased aluminum housing with red finish. Notifier, Simplex, Potter, Grinnell.

F. Fire Department Connections: Elkhart, Croker Standard, Potter Roemer.
1. Type: Free standing type with ductile iron pedestal chrome plated finish.
2. Outlets: Two way with thread size to suit fire department hardware; threaded dust cap and chain of matching material and finish.
3. Drain: 3/4 inch automatic drip, outside.
4. Label: "Sprinkler – Fire Department Connection".

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with referenced NFPA design and installation standard and these specifications.

B. Sprinklers shall be in line with and centered between down lights unless shown otherwise.

C. Install equipment in accordance with manufacturer's instructions.

D. Each floor of multi story buildings shall be zoned.

E. All dry system piping shall be galvanized down stream of dry valve.

F. Install buried shut-off valves in valve box. Provide post indicator.

G. Provide approved double detector check assembly at sprinkler system water source connection.

H. Locate fire department connection within forty (40'-0") feet of nearest fire hydrant and with sufficient clearance from walls, obstructions, or adjacent siamese connectors to allow full swing of fire department wrench handle.

I. Locate outside alarm gong on building wall at piping entrance to building.

J. Place pipe runs to minimize obstruction to other work.

K. Place piping in concealed spaces above finished ceilings.

L. Center sprinklers in two directions in ceiling tile and provide piping offsets as required.

M. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting. Replace painted sprinklers.

N. Where sprinklers are required under rectangular duct, the centerline of the sprinkler shall be minimum 6" under duct

O. Install air compressor on vibration isolators.

P. Flush entire piping system of foreign matter.

Q. Hydrostatically test entire system.

R. Require test be witnessed by Fire Marshall.

S. All drain piping shall discharge to the outside 6" maximum above grade unless noted otherwise.

T. Where sprinklers are required under oval or round duct, the centerline of the sprinkler shall be under the centerline of the duct.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Ensure required tamper and flow devices are installed and connected as required to fire alarm system including but not limited to Floor control valves, alarm check valve, elevator shaft isolation valve, Post Indicator Valve (PIV) and backflow device valves.

3.3 SCHEDULES

A. System Hazard Areas:
1. Office & Public Areas, Residential Living Areas, and similar occupancies – Light Hazard Design; 0.10 GPM/sq. ft. over the most remote 1500 square foot.
2. Automobile Parking Areas, Building Service Areas, Electrical Equipment Rooms, General Storage Areas, Laundries, Mechanical Equipment Rooms, Restaurant Service Areas, and similar occupancies – Ordinary Hazard Group 1 Design; 0.15 GPM/sq.ft. over the most remote 1500 square foot.

END OF SECTION

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GEORGIA REGISTERED No. PE036664 PROFESSIONAL ENGINEER KRUNAL M PATEL

CITY OF COVINGTON ESTABLISHED 1822 FIRE RESCUE PROFESSIONALLY ACCREDITED 2005 GEORGIA FIRE DEPARTMENT

FIRE STATION #23

City of Covington

HIGHWAY 36
COVINGTON, GA 30014

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Sheet Title

FIRE PROTECTION SPECIFICATIONS

Sheet No.

P0.2

RELEASED FOR CONSTRUCTION