

---

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1      Section 21 05 05 - Common Work Results for Fire Suppression.
- .1      Section 23 05 05 - Installation of Pipework.
- .2      Section 23 05 19 - Thermometers and Pressure Gauges - Piping Systems.
- .3      Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
- .4      Section 23 05 49.01 - Seismic Restraint Systems.
- .5      Section 23 05 53.01 - Mechanical and Network Equipment Identification.

**1.2            REFERENCES**

- .1      American National Standards Institute (ANSI)/American Petroleum Institute (API).
  - .1      ANSI/API Spec 5L, Specification for Line Pipe.
- .2      American Society for Testing and Material (ASTM).
  - .1      ASTM A-47M, Standard Specification for Ferritic Malleable Iron Castings.
  - .2      ASTM A-53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - .3      ASTM A-135, Standard Specification for Electric-Resistance-Welded Steel Pipe.
- .3      Canadian Standards Association/CSA International.
  - .1      CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.
  - .2      CSA W47.1, Certification of companies for fusion welding of steel.
  - .3      CAN/CSA B64.10-01, Selection and installation of backflow preventers.
- .4      National Fire Protection Association (NFPA).
  - .1      ANSI/NFPA 13-2013, Installation of Sprinkler Systems.
  - .2      NFPA 25-2014, Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.
  - .3      NFPA 30-2015, Flammable and Combustible Liquids Code.
  - .4      NFPA 170-2012, Standard for Fire Safety and Emergency Symbols.

**1.3            SUBMITTALS**

- .1      Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures and in accordance with NFPA 13.

- .2 Submit erection drawings as required in NFPA 13 Standard for execution drawings criteria.
- .3 Shop drawings shall include manufacturing materials, finishes, anchoring method, the number of anchors, dimensions, construction and assembly details, accessories for equipment, tables, and performance curves of apparatus.

#### **1.4 CLOSEOUT SUBMITTALS**

- .1 Submit all required documents and items after completion of work for incorporation into manual such as specified in Section 01 78 00 - Closeout Submittals.
- .2 Maintenance Data Sheets.
  - .1 Maintenance data sheets must include the following elements:
    - .1 Technical data from catalogs and product literature, including the model number, type and size for the items mentioned below.
      - .1 Piping and fittings;
      - .2 Alarm check valves;
      - .3 Valves, including gate valves, check valves, and globe valves;
      - .4 Sprinklers;
      - .5 Pipes hangers and suspension;
      - .6 Monitoring switches;
      - .7 Compressors;
      - .8 Mechanical couplings.
    - .2 Relevant details concerning operation, maintenance, and servicing.
    - .3 A list of recommended spare parts.
  - .3 Provide a copy of NFPA 25 "Inspection, Testing, and Maintenance of Water Based Fire Protection Systems" and incorporate it into the "Operation and Maintenance Manual".

#### **1.5 HEALTH AND SAFETY**

- .1 Take necessary measures to ensure health and safety on construction site, in accordance with Section 01 35 29.06 - Health and Safety Requirements.

#### **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Sort waste in order to re-use and recycle in conformity with section 01 74 21 - Waste Management Plan.
- .2 Collect packaging materials and send to appropriate recycling facilities.
- .3 Collect and sort plastic, paper, and corrugated cardboard wrappings, and dispose them in appropriate designated bins in conformity with the Waste Management Plan.

- .4 Disposed unused metallic elements in designated area for metal recycling.
- .5 Sort metal banding, flatten, and place in designated area for recycling.

## **1.7 SKETCHES**

- .1 Submit a diagram complying with Requirements.
- .2 Submitted diagram must include following items:
  - .1 A key localisation plan at 1: 500 scale;
  - .2 A drawing for every floor (basement, ground floor, above ground floors) affected by fire protection work, showing the zone covered by each system, localisation of isolating valves, flow detectors, and drainage test pipes.
- .3 Once approved, provide two laminated copies of the diagram, plasticized, glued on plywood, and inserted in a solid wooden frame.
- .4 Install one diagram in the alarm valve room and deliver the other one to the Departmental Representative.

## **1.8 SPARE PARTS AND MAINTENANCE**

- .1 Provide extra material spare parts for maintenance as required by Section 01 78 00 - Closeout Submittals.
- .2 Provide spare sprinklers and tools as required by NFPA 13 Standard.

## **1.9 ACCEPTABLE PRODUCTS AND MATERIALS**

- .1 Where a particular brand name is stipulated, see Instructions to Bidders for procedure for requesting approval of substitute materials and products.

## **Part 2 Products**

### **2.1 GENERAL**

- .1 All products used in fire safety installations must be "cUL" or "ULC" listed and must be labelled as such.
- .2 Provide accessories that can withstand the normal pressure exerted in the fire protection network.

## 2.2 PIPES AND FITTINGS

- .1 Pipes:
  - .1 Pipes NPS 2 or less:
    - .1 Galvanized steel, Schedule 40, grooved or threaded, complying with NFPA 13 and ASTM A-53 or ASTM A-135 Standards.
  - .2 Pipes NPS 2 ½ and over:
    - .1 Galvanized steel, Schedule 10, roll grooved, complying with NFPA 13 and ASTM A-135 Standards.
  - .3 Acceptable products:
    - .1 Allied;
    - .2 Bull Moose;
    - .3 Wheatland;
    - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .2 Fittings and couplings as per NFPA 13 Standard:
  - .1 Use fittings and couplings with galvanized finish when not painted galvanized steel pipes are being used in finished areas and when galvanized steel pipes are being used outside.
  - .2 Use anticorrosive paint in all roll grooved couplings and on the threads of galvanized steel pipes, located outside the building.
  - .3 Fittings and couplings up to NPS 2:
    - .1 Fittings and joints, rigid, provided by same manufacturer.
    - .2 Fittings, screwed with teflon tape, to ASTM A-47M, Grade 32510.
    - .3 Joints for pipes with grooved ends, Standard coupling to CSA B242 and ANSI/API Spec 5L.
    - .4 Fittings with grooved ends, to ASTM A-536, Grade 65-45-12.
  - .4 Fittings and couplings NPS 2½ and over:
    - .1 Joints and fittings, rigid, provided by the same manufacturer.
    - .2 Fittings and welded flanges, to CSA W47.1 and CSA W47.1S1. No welding is permitted on galvanized steel pipes.
    - .3 Joints for pipes with grooved ends, Standard couplings, to CSA B242 and ANSI B-3620 (API-5L).
    - .4 Fittings with grooved ends, to ASTM A-536, Grade 65-45-12.

## 2.3 AUXILIARY VALVES

- .1 All valves to be listed for fire protection service.
- .2 Acceptable Products:
  - .1 Valves, NPS 2 and less, threaded ends:
    - .1 Bronze gate valves, with outside screw and yoke (OS&Y):
      - .1 Acceptable products:
        - .1 Nibco T-104-0;
        - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
      - .2 Bronze ball valves:
        - .1 Acceptable products:
          - .1 Victaulic S/728 Firelock with monitoring switches;
          - .2 Anvil F171N;
          - .3 Jenkins Fig. 202J;
          - .4 Nibco KT-505-W-8;
          - .5 Replacement materials or products: approved by addendum according to Instructions to bidders.
    - .2 Valves, NPS 2 and less, grooved ends:
      - .1 Bronze ball valves.
        - .1 Acceptable products:
          - .1 Victaulic S/728 Firelock with monitoring switches;
          - .2 Nibco KG-505-W-8;
          - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
  - .3 Gate valves, NPS 2½ and over, grooved or flanged ends:
    - .1 Ductile iron gate valve with outside screw and yoke (OS&Y), bronze trim, grooved ends.
      - .1 Acceptable products:
        - .1 Victaulic 771H;
        - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
    - .2 Ductile iron gate valve with outside screw and yoke (OS&Y), bronze trim, flanged ends.
      - .1 Acceptable products:
        - .1 Nibco F-607-RW;
        - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

- .4 Butterfly valves, NPS 2½ and over, with monitoring switch:
  - .1 Ductile iron butterfly valves, with indicating yoke, flanged ends.
    - .1 Acceptable products:
      - .1 Tyco, model BFV-N, TFP1520;
      - .2 Nibco LD3510-8;
      - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
    - .2 Ductile iron butterfly valves, with indicating yoke, grooved ends.
      - .1 Acceptable products:
        - .1 Victaulic S/705W Firelock;
        - .2 Tyco, models BFV-N, TFP1510 and TFP1515;
        - .3 Gruvlok GN722-FP, GN7722-6D and AE7722-3A;
        - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
  - .5 Swing check valves with composite material disc:
    - .1 Flanged ends:
      - .1 Acceptable products:
        - .1 Nibco F908W;
        - .2 Viking D-1 and G-1 flanged;
        - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
      - .2 Grooved ends:
        - .1 Acceptable products:
          - .1 Victaulic S/717 Firelock;
          - .2 Gruvlok 78FP and 7800 Series;
          - .3 Viking D-1 and G-1 grooved;
          - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
      - .3 Quiet type, adapted for flanged ends:
        - .1 Acceptable products:
          - .1 Rite, model 212;
          - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
    - .6 Ball drip:
      - .1 Acceptable products:
        - .1 Victaulic S/748;
        - .2 Viking B-1;
        - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.

## **2.4 SUSPENSIONS**

- .1 Hangers for fire protection service, in compliance with NFPA 13 Standard, as well as Sections 23 05 29 - Hangers and Supports for HVAC Piping and Equipment and 23 05 49.01 - Seismic Restraint Systems (SRS) Requirements.

## **2.5 FIRE STOPPING AND SMOKE CONTROL SYSTEMS**

- .1 Fire stopping and smoke control systems for penetrations of fire separation assemblies, in accordance with requirements described in section 07 84 00 – Firestopping.

## **2.6 SPRINKLERS**

- .1 General Requirements: sprinkler heads complying with NFPA 13 Standard, and approved for fire protection service.
- .2 Provide for bidding an additional quantity of each type of sprinklers equivalent to 5% of the number of each type of sprinkler provided, including installation.
- .3 Sprinkler guard for sprinkler exposed to mechanical shock, with zinc coated steel rod, provided by the same manufacturer as the sprinkler it protects.
- .4 Upright Sprinklers:
  - .1 Upright sprinkler, quick-response, with frangible bulb, "K" factor of 5.6 (G-01):
    - .1 Acceptable products:
      - .1 Viking Microfast, model M, VK-300;
      - .2 Victaulic, style V2704;
      - .3 Tyco, model TY3131;
      - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
    - .2 Upright sprinkler, quick-response, with frangible bulb, "K" factor of 4.2 (G-02):
      - .1 Acceptable products:
        - .1 Viking, model VK327;
        - .2 Tyco, model TY2131;
        - .3 Reliable, model R3623;
        - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
    - .3 Temperature ratings: 68°C, 93°C, 141°C, as needed or as indicated on drawings.
    - .4 Finish: brass, bronze, black polyester, color to the choice of the Architect, corrosion resistant, as indicated on drawings.
    - .5 Maximal distance per sprinkler:
      - .1 Incombustible construction:
        - .1 Light hazard:
          - .1 Maximal coverage: 20.9 m<sup>2</sup>.

- .2 Maximal distance between heads: 4.6 m.
  - .2 Ordinary hazard:
    - .1 Maximal coverage: 12.1 m<sup>2</sup>.
    - .2 Maximal distance between heads: 4.6 m.
  - .3 Extra hazard:
    - .1 Maximal coverage: 9.3 m<sup>2</sup>.
    - .2 Maximal distance between heads: 3.6 m.
  - .2 Combustible construction:
    - .1 Light hazard – unobstructed ceiling and obstructed ceiling with exposed members with 915 mm or more on center:
      - .1 Maximal coverage: 12.1 m<sup>2</sup>.
      - .2 Maximal distance between heads: 3.6 m.
    - .2 Light hazard - obstructed and unobstructed ceiling with exposed members less than 915 mm on center:
      - .1 Maximal coverage: 9.3 m<sup>2</sup>.
      - .2 Maximal distance between heads: 3.6 m.
    - .3 Light hazard – Ceiling with wood joist or wood truss construction with members less than 915 mm on center and slope having pitch greater than 4 in 12:
      - .1 Maximal coverage: 9.3 m<sup>2</sup>.
      - .2 Maximal distance between heads:
        - .1 2,4 m perpendicular to the slope.
        - .2 3.6 m parallel to the slope.
    - .4 Ordinary hazard:
      - .1 Maximal coverage: 9.3 m<sup>2</sup>.
      - .2 Maximal distance between heads: 3.6 m.
- .5 Pendant Sprinklers:
  - .1 Pendant sprinklers, dry type, with escutcheon, quick response, with frangible bulb, "K" factor of 5.6 (G-08):
    - .1 Acceptable products:
      - .1 Viking QR dry adjustable STD, VK-176;
      - .2 Victaulic, style V3606;
      - .3 Tyco, model TY3235;
      - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
  - .2 Temperature ratings: 68°C, 93°C, 141°C, as needed or as indicated on drawings.
  - .3 Finish: brass, bronze, black polyester, color to the choice of the Architect, corrosion resistant, as indicated on drawings.



- .4 Maximal distance per sprinkler:
  - .1 Incombustible construction:
    - .1 Light hazard:
      - .1 Maximal coverage: 20.9 m<sup>2</sup>.
      - .2 Maximal distance between heads: 4.6 m.
    - .2 Ordinary hazard:
      - .1 Maximal coverage: 12.1 m<sup>2</sup>.
      - .2 Maximal distance between heads: 4.6 m.
    - .3 Extra hazard:
      - .1 Maximal coverage: 9.3 m<sup>2</sup>.
      - .2 Maximal distance between heads: 3.6 m.
  - .2 Combustible construction:
    - .1 Light hazard – unobstructed ceiling and obstructed ceiling with exposed members with 915 mm or more on center:
      - .1 Maximal coverage: 12.1 m<sup>2</sup>.
      - .2 Maximal distance between heads: 3.6 m.
    - .2 Light hazard - obstructed and unobstructed ceiling with exposed members less than 915 mm on center:
      - .1 Maximal coverage: 9.3 m<sup>2</sup>.
      - .2 Maximal distance between heads: 3.6 m.
    - .3 Light hazard – Ceiling with wood joist or wood truss construction with members less than 915 mm on center and slope having pitch greater than 4 in 12:
      - .1 Maximal coverage: 9.3 m<sup>2</sup>.
      - .2 Maximal distance between heads:
        - .1 2.4 m perpendicular to the slope.
        - .2 3.6 m parallel to the slope.
    - .4 Ordinary hazard:
      - .1 Maximal coverage: 9.3 m<sup>2</sup>.
      - .2 Maximal distance between heads: 3.6 m.
- .6 Sidewall Sprinklers:
  - .1 Sidewall sprinklers, quick response, with frangible bulb, "K" factor of 5.6 (G-11):
    - .1 Acceptable products:
      - .1 Viking Microfast, model M, VK-305;
      - .2 Victaulic, style V2710;
      - .3 Tyco, model TY3331;
      - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

- .2 Finish: bronze, white polyester, black polyester, color to the choice of the Architect, as indicated on drawings.
- .3 Maximal distance per sprinkler:
  - .1 Noncombustible finish:
    - .1 Light hazard:
      - .1 Maximal coverage: 18.2 m<sup>2</sup>.
      - .2 Maximal distance between heads along wall: 4.3 m.
      - .3 Maximal projection distance: 4.3 m.
    - .2 Ordinary hazard:
      - .1 Maximal coverage: 9.3 m<sup>2</sup>.
      - .2 Maximal distance between heads along wall: 3 m.
      - .3 Maximal projection distance: 3 m.
  - .2 Combustible finish:
    - .1 Light hazard:
      - .1 Maximal coverage: 7.4 m<sup>2</sup>.
      - .2 Maximal distance between heads along wall: 3 m.
      - .3 Maximal projection distance: 3 m.
    - .2 Light hazard – Extended coverage:
      - .1 Maximal coverage: 30.1 m<sup>2</sup>.
      - .2 Maximal distance between heads along wall: 5.5 m.
      - .3 Maximal projection distance: 5.5 m.
    - .3 Ordinary Hazard:
      - .1 Maximal coverage: 6 m<sup>2</sup>.
      - .2 Maximal distance between heads along wall: 2.4 m.
      - .3 Maximal projection distance: 2.4 m.

## 2.7 DRY PIPE ALARM CHECK VALVE (SSA-01 TO SSA-04)

- .1 Dry pipe alarm check valve complying with NFPA 13, for fire protection use, including a compressed air supply, a pressure switch for the compressor, a relief valve, a high and low pressure switches, a supervised control valve, pressure gauges and all accessories, and piping required for proper check valve assembly.
  - .1 Acceptable products:
    - .1 Viking, model F-2;
    - .2 Victaulic, model Firelock NXT-Dry, 768 Series;
    - .3 Tyco, model DPV-1;
    - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

## **2.8 COMPRESSED AIR SUPPLY (SSA-01)**

- .1 Piping located after the dry pipe alarm check valve is monitored by an air pressure coming from the compressed air supply.
- .2 The compressor has the capacity to restore the normal working pressure within 30 minutes.
- .3 Characteristics:
  - .1 Types: compressor with no tank, installed on the riser.
  - .2 Power: ½ HP.
  - .3 Voltage: 115 V.
  - .4 Number of phases: 1.
  - .5 Frequency: 60 Hz.
  - .6 Acceptable products:
    - .1 General Air Products, model OL 33550AC;
    - .2 Victaulic, 7C7 Series;
    - .3 Gast, model 4LCB-46S-M450GX;
    - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

## **2.9 COMPRESSED AIR SUPPLY (SSA-02 TO SSA-04)**

- .1 Piping located after the dry pipe alarm check valve is monitored by an air pressure coming from the compressed air supply.
- .2 The compressor has the capacity to restore the normal working pressure within 30 minutes.
- .3 Characteristics:
  - .1 Types: compressor with a joint air tank and air supply with an air pressure regulation device.
  - .2 Power: 1 HP or 1½ HP.
  - .3 Voltage: 115 V.
  - .4 Number of phases: 1.
  - .5 Frequency: 60 Hz.
  - .6 Acceptable products:
    - .1 Compressor with tank:
      - .1 General Air Products, model OL900V100ACT (1 HP);
      - .2 Gast, model 7DLE-46T-M750X (1½ HP);
      - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.

- .2 Pressure regulation device:
  - .1 General Air Products, model AMD-1;
  - .2 Tyco, model AMD-1;
  - .3 Victaulic, 757 Series;
  - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

## **2.10 MONITORING SWITCHES**

- .1 General: switches approved for fire protection service, complying with NFPA 13 Standard.
- .2 Valves:
  - .1 Mechanically attached to valve body, with normally open and normally closed contacts, with monitoring capability.
  - .2 Add monitoring contacts on non-supervised valves, as indicated on-site.
  - .3 Acceptable products:
    - .1 OS&Y valve:
      - .1 System Sensor, model OSY2A;
      - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
    - .2 Pluggable valves:
      - .1 System Sensor, model PSP1A;
      - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .3 Pressure Switches:
  - .1 Designed to ensure monitoring of the system.
  - .2 Acceptable products, high and low pressure:
    - .1 System Sensor, EPSAxx-2;
    - .2 Potter, PS120-2A;
    - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
  - .3 Acceptable products, pressure alarm switch:
    - .1 System Sensor, EPS10-2;
    - .2 Potter, PS10-2A;
    - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.

## **2.11 PRESSURE GAUGES**

- .1 Pressure gauges in compliance with Section 23 05 19 - Thermometers and Pressure Gauges - Piping Systems.

- .2 Maximum limit of not less than twice normal working pressure at point where installed.

## **2.12 IDENTIFICATION**

- .1 Indicating plates for test/drain valves: to NFPA 13 Standard.
- .2 Provide and install at the base of riser in a permanent manner three hydraulic design information sign, including the following information:
  - .1 Location of the design area;
  - .2 Discharge density over the design area;
  - .3 System flows and residual pressures requirements at the base of riser;
  - .4 Occupancy classification;
  - .5 Hose stream allowance included.
- .3 Fire protection equipment identification to NFPA 170, Standard for Fire Safety and Emergency Symbols.
- .4 Refer to Section 23 05 53.01 - Mechanical and Network Equipment Identification.

## **2.13 SPARE PARTS CABINETS**

- .1 Cabinet for maintenance material, special tools, and spare sprinklers, including sprinkler wrench. Cabinets shall be installed near alarm check valves. It shall contain at least two models of each sprinkler type. The cabinet must contain a minimum of 12 sprinklers.
- .2 Cabinets must be constructed as per sprinkler system manufacturer's Standards.
  - .1 Acceptable products:
    - .1 Victaulic, style SA1-000-0000;
    - .2 Tyco;
    - .3 Viking;
    - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### **3.2 INSTALLATION**

- .1 Install, inspect, and perform acceptance tests of sprinkler systems in accordance with NFPA 13.
- .2 Execute installation in accordance with established Standards and laws, regulations and current codes, and Standards Requirements.
- .3 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
- .4 Proper operation and installation coordination of the system, including automatic sprinkler system, system's monitoring points as well as the systems commissioning, are all under the fire protection Contractor's responsibility.
- .5 Connect the compressors to the different dry pipe systems.
- .6 Clearly identify main shut-off valves, drain valves, by-pass valves, and all auxiliary valves.
- .7 Install the piping for the dry pipe system with a slope for drainage towards the system lowest point. Slope of 0.4% on the service pipes and 0.2% on the supply pipes.
- .8 Provide the lowest points of the dry pipe system with adequate drainage devices, in accordance with NFPA 13.
- .9 Install hydraulic design information signs on the riser, near alarm checkvalves.
- .10 Install drainage piping of test drains to provided open drains.
- .11 Drain the network at the end of the tests.

### **3.3 TRAINING**

- .1 Contractor shall organize a 2-hour training session for the building's operation and maintenance staff.
- .2 Staff training shall cover normal sprinkler system operation, emergency procedure, and system maintenance, as per NFPA 25 Standard.

### **3.4 TESTS AND VERIFICATIONS**

- .1 Carry out the following tests on the sprinkler systems, complying with NFPA 13 Standard:
  - .1 Execute an air leak test on the piping network at a pressure of 275 kPa during 24-hour. Correct each leak allowing a pressure drop of more than 10 kPa during the 24 hours test.

- .2 Execute complete hydrostatic testing on the automatic sprinkler systems piping and appurtenances at a pressure of 1,380 kPa for 2 hours.
- .3 Complete a flow test through the test connection of each zone in order to confirm flow switches operation. The alarm signals must be transmitted to the alarm panel within 1 minute maximum starting at test connection opening and during test flow.
- .4 Complete a flow test through the test connections fully opened to ensure that no pressure build-up occurs in the drainage piping, that could affect the proper operation of the system.
- .5 Execute opening and closing of all water supply control valves while under system pressure.
- .6 Execute a test showing that the air working pressure can be restore within 30 minutes.
- .2 Conduct tests in presence of the Departmental Representative and supply test certificates, as required by NFPA 13.

### **3.5 REPORT AND CERTIFICATE**

- .1 Provide both inspection report and inspection attestation to the Departmental Representative at the end of the project, in addition to the properly completed and signed Contractor materials and tests certificate. Record all tests results in a notebook appended to the report.

### **3.6 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**