
Part 1 General

1.1 RELATED SECTIONS

- .1 Section 07 84 00 - Firestopping.
- .2 Section 21 05 05 - Common Work Results for Fire Suppression.
- .3 Section 23 05 05 - Installation of Pipework.
- .4 Section 23 05 19 - Thermometers and Pressure Gauges - Piping Systems.
- .5 Section 23 05 29 - Hangers and Supports For HVAC Piping and Equipment.
- .6 Section 23 05 49.01 - Seismic Restraint Systems (SRS).
- .7 Section 23 05 53.01 - Mechanical 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.
- .5 National Sanitation Foundation.
 - .1 NSF/ANSI Standard 61: Drinking Water System Components.

1.3 SUBMITTALS

- .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit coordinated erection drawings with all others disciplines, according to the construction documents.
- .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 Backflow preventer.
 - .5 Sprinklers;
 - .6 Pipes hangers and suspension;
 - .7 Monitoring switches;
 - .8 Fire department connection;
 - .9 Excess pressure pump;
 - .10 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 diagram complying with requirements.
- .2 Submitted diagram must include following items:
 - .1 A key localisation plan at 1: 500 scale;
 - .2 A plan for every floor (basement, ground floor, above ground floor and attics) 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.
- .5 When there is more than one zone control per floor, install diagram near zone controls of each floor to clearly show the protected areas.

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 Black 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 Black steel, Schedule 10, roll grooved, complying with NFPA 13 and ASTM A-135 Standards.
 - .2 Black steel, Schedule 40, roll grooved, for piping located inside the service tunnel, between East block and Central block mechanical rooms, complying with ASTM A-53. Piping must be shop painted before installation.
 - .3 Stainless steel, Schedule 10, 304L grade, from the first flange located inside the building, up to the backflow preventer, in conformity with ASTM and NSF/ANSI-61 and with AWWA Requirements.
 - .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 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.
 - .2 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.

- .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 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 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 BACKFLOW PREVENTER

- .1 Backflow preventer, complying with CAN/CSA B64.10-01 Standard and approved for fire protection network.
- .2 Backflow preventers with double check valve assembly and supervised valves:
 - .1 Acceptable products:
 - .1 Wilkins, 350 Series;
 - .2 Watts, 757 Series;
 - .3 Apollo, DC-4SG Series;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.5 HANGERS

- .1 Hangers for fire protection service, in conformity 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.

2.6 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.

2.7 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 Upright sprinkler, dry type, quick-response, with frangible bulb, "K" factor of 5.6 (G-03):
 - .1 Acceptable products:
 - .1 Viking QR adjustable dry STD, VK-184;
 - .2 Victaulic, style V3602;
 - .3 Tyco, model TY3135;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .4 Upright sprinklers, extended coverage, quick-response, with frangible bulb, "K" factor of 11.2 (G-04):
 - .1 Acceptable products:
 - .1 Viking, model VK532;
 - .2 Tyco, model TY5137;
 - .3 Reliable, model RA7326;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .5 Temperature ratings: 68°C, 93°C, 141°C, as needed or as indicated on drawings.
- .6 Finish: bronze, brass, white polyester, black polyester, color to the choice of the Architect, corrosion resistant, as indicated on drawings.
- .7 Maximal distance per sprinkler:
 - .1 Incombustible construction:
 - .1 Light hazard:
 - .1 Maximal coverage: 20.9 m².
 - .2 Maximal distance between heads: 4.6 m.
 - .2 Ordinary hazard:
 - .1 Maximal coverage: 12.1 m².
 - .2 Maximal distance between heads: 4.6 m.
 - .3 Extra hazard:
 - .1 Maximal coverage: 9.3 m².
 - .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 m².
 - .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 m².
 - .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 m².
 - .2 Maximal distance between heads:
 - .1 2.4 m perpendicular to the slope.
 - .2 3.6 m parallel to the slope.
 - .4 Light hazard – extended coverage in unobstructed ceiling:
 - .1 Maximal coverage: 30.1 m²;
 - .2 Maximal distance between heads: 5.5 m.
 - .5 Ordinary hazard:
 - .1 Maximal coverage: 9.3 m².
 - .2 Maximal distance between heads: 3.6 m.
- .5 Pendant Sprinklers:
 - .1 Semi-recessed pendant sprinklers, with semi-recessed escutcheon, quick response, with frangible bulb, "K" factor of 5.6 (G-05):
 - .1 Acceptable products:
 - .1 Viking Microfast, model M, VK-302 and E-1 escutcheon;
 - .2 Victaulic, style V2708;
 - .3 Tyco, model TY3231;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 Pendant concealed sprinklers, quick response, with frangible bulb, "K" factor of 5.6. Cover plate finish and color to the choice of the Architect (G-06):
 - .1 Acceptable products:
 - .1 Viking, model VK462;
 - .2 Victaulic, style V3802;
 - .3 Tyco, model TY3531;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

- .3 Pendant sprinklers, quick response, with frangible bulb, "K" factor of 5.6 (G-07):
 - .1 Acceptable products:
 - .1 Viking Microfast, model M, VK-302;
 - .2 Victaulic, style V2708;
 - .3 Tyco, model TY3231;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .4 Pendant sprinklers, dry type, 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.
 - .5 Pendant sprinklers, extended coverage, quick response, with frangible bulb, "K" factor of 8.0 (G-09):
 - .1 Acceptable products:
 - .1 Viking, model VK602;
 - .2 Tyco, model TY4232;
 - .3 Reliable, model R4842;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .6 Pendant concealed sprinklers, extended coverage, quick response, with frangible bulb, "K" factor of 8.0. Cover plate finish and color to the choice of the Architect (G-10):
 - .1 Acceptable products:
 - .1 Viking, model VK634;
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .7 Temperature ratings: 68°C, 93°C, 141°C, as needed or as indicated on drawings.
 - .8 Finish: bronze, white polyester, black polyester, color to the choice of the Architect, corrosion resistant, as indicated on drawings.
 - .9 Maximal distance per sprinkler:
 - .1 Incombustible construction:
 - .1 Light hazard:
 - .1 Maximal coverage: 20.9 m².
 - .2 Maximal distance between heads: 4.6 m.
 - .2 Ordinary hazard:
 - .1 Maximal coverage: 12.1 m².

- .2 Maximal distance between heads: 4.6 m.
 - .3 Extra hazard:
 - .1 Maximal coverage: 9.3 m².
 - .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 m².
 - .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 m².
 - .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 m².
 - .2 Maximal distance between heads:
 - .1 2.4 m perpendicular to the slope.
 - .2 3.6 m parallel to the slope.
 - .4 Light hazard – Extended coverage in unobstructed ceiling:
 - .1 Maximal coverage: 30.1 m²;
 - .2 Maximal distance between heads: 5.5 m.
 - .5 Ordinary hazard:
 - .1 Maximal coverage: 9.3 m².
 - .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 Semi-recessed sidewall sprinklers, quick response, with frangible bulb, "K" factor of 5.6 (G-12):
 - .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.
- .3 Sidewall concealed sprinklers, extended coverage, quick response, with frangible bulb, "K" factor of 8.0. Cover plate finish and color to the choice of the Architect (G-13):
 - .1 Acceptable products:
 - .1 Viking, model VK680;
 - .2 Reliable, RA4762;
 - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .4 Sidewall sprinklers, dry type, quick response, with frangible bulb, "K" factor of 5.6 (G-14):
 - .1 Acceptable products:
 - .1 Viking, model VK178;
 - .2 Victaulic, model V3610;
 - .3 Tyco, model DS-1, TY3335;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .5 Sidewall semi-recessed sprinklers, dry type, extended coverage, quick response, with frangible bulb, "K" factor of 5.6 (G-15):
 - .1 Acceptable products:
 - .1 Viking, model VK188;
 - .2 Tyco, model DS-1, TY3338;
 - .3 Reliable, model RA1664;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .6 Temperature ratings: 68°C, 93°C, 141°C, as needed.
 - .7 Finish: bronze, white polyester, black polyester, color to the choice of the Architect, corrosion resistant, as indicated on drawings.
 - .8 Maximal distance per sprinkler:
 - .1 Noncombustible finish:
 - .1 Light hazard:
 - .1 Maximal coverage: 18.2 m².
 - .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 m².
 - .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 m².
 - .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 m².
 - .2 Maximal distance between heads along wall: 5.5 m.
 - .3 Maximal projection distance: 5.5 m.
 - .3 Ordinary Hazard:
 - .1 Maximal coverage: 6 m².
 - .2 Maximal distance between heads along wall: 2.4 m.
 - .3 Maximal projection distance: 2.4 m.

2.8 WET PIPE ALARM CHECK VALVE (SSE0-01 TO SSE-03)

- .1 Wet pipe alarm check valve complying with NFPA 13, for fire protection use, including an excess pressure pump 120/1/60, pump pressure switch, relief valve, high and low pressure switches, flow detector, supervised control valve, pressure gauges, and all accessories and piping required for proper check valve assembly.
 - .1 Acceptable products:
 - .1 Alarm check valve:
 - .1 Viking, model J-1;
 - .2 Victaulic, style 759 ou 751;
 - .3 Tyco, model AV-1-300;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.9 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 Flow Switches:
 - .1 Designed to ensure monitoring of the system:
 - .1 Acceptable products:
 - .1 System Sensor, WFDxxA Series;
 - .2 Potter, VSR;
 - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .4 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.

2.10 FIRE DEPARTMENT CONNECTION

- .1 Twin type connection, as per NFPA 13 Standard, ULC listed, installed as shown, with metallic caps and chains, and threaded in conformity with local fire department threading.
- .2 Connection with following characteristics: built-in antique bronze plate with polish finish, with antique bronze plate embedded inscription, threaded bronze caps with chains.
- .3 Acceptable Products:
 - .1 CFH, model 229;
 - .2 Giacomini, A101 or A102 with plate model A103;
 - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.11 PRESSURE GAUGES

- .1 ULC approved 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.
- .3 Provide an isolating bronze ball valve, with drainage fitting at every gauge.

2.12 IDENTIFICATION

- .1 Indicating plates for test/drain valves: to NFPA 13 Standard.
- .2 Hydraulic design information sign:
 - .1 Provide and install at the base of riser in a permanent manner ten 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 department connection identification:
 - .1 Identification plate for fire department connection shall indicate that it serves all sprinklers and standpipes of the building.
- .4 Fire protection equipment identification to NFPA 170, Standard for Fire Safety and Emergency Symbols.
- .5 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 install near alarm check valves. It shall contain at least two model of each sprinkler type. The cabinet must contain a minimum of 24 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.

2.14 EXCESS PRESSURE PUMP

- .1 Pump: positive displacement, close coupled, direct drive, complete with cut-off valve.
- .2 Motor: single phase, induction, squirrel cage, 120 V, 60 Hz, 1 phase, 0.25 kW, 1,725 RPM, open drip proof motor, ball bearings, Class B, complying with EEMAC, continuous duty, and capable of resisting a 50°C temperature raise.
- .3 Flow: 0.13 L/s.
- .4 Contact for excess pressure pump, set for a 103 kPa pressure difference.
- .5 Electrical Connections: as per Division 26.
- .6 Pump suction complete with control valve, strainer and flexible coupling; pump discharge complete with cut-off valve, check valve, control valve, and flexible coupling.

2.15 TEST AND DRAIN VALVE

- .1 Combined valve for test and drain, including one three-position ball valve, two flow indicators, pressure gauge outputs, and a label plate indicating orifice diameter.
 - .1 Acceptable products:
 - .1 Victaulic S/720 TestMaster™ II or S/747 Riser Manifold;
 - .2 AGF, model 1000;
 - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Conformity: 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 Install excess pressure pump and connect it to the alarm check valve, as per manufacturer's instructions.
- .6 Clearly identify main shut-off valves, drain valves, by-pass valves, and all auxiliary valves.
- .7 Install shop painted sprinkler guard on pendant sprinklers located in closets and under obstructions of 1,200 mm width or more.
- .8 Install hydraulic design information signs on the riser, near alarm checkvalves.
- .9 Install drainage piping of test drains to provided open drains.

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 complete hydrostatic testing on the automatic sprinkler systems piping and appurtenances at a pressure of 1,380 kPa for 2 hours.
 - .2 Complete a flow test through the test connection of each zones in order to confirm flow switches operation. The alarm signals must be transmitted to the alarm panel within 60 secondes maximum starting at test connection opening and during test flow.
 - .3 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.
 - .4 Execute opening and closing of all water supply control valves while under system pressure.
 - .5 Conduct a flow test on the backflow preventer In order to confirm proper operation of equipment. Minimal flow must correspond to the highest sprinkler system demand.
- .2 Conduct tests in presence of the Departmental Representative and supply test certificates, as required by NFPA 13 and CAN/CSA B64.10-01 Standards.

- .3 Contractor must supply a test certificate as required by CAN/CSA B64.10-01 for each backflow preventer installed.

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