## 1. GENERAL

### 1.01 SUBMITTALS

.1 Submit shop drawings/product data sheets to regulatory authority for review and approval prior to submitting to the Consultant. Conform to following requirements:

.1 submit shop drawings/product data sheets for all products specified in this Section except pipe and fittings;

.2 sprinklers shall be referred to on drawings and product submittals, and be specifically identified by the manufacturer's listed model or series designation. Trade names and other abbreviated listings are not allowed;

.3 submit complete CAD layout drawings indicating source of water supply with test flow and pressure, "head-end" equipment piping schematic, pipe routing and sizing, and zones, all signed and sealed by a qualified professional mechanical engineer registered in jurisdiction of the work as specified below;

.4 submit copies of all calculations, including hydraulic calculations, stamped and signed by same engineer who signs layout drawings, and a listing of all design data used in preparing the calculations, system layout and sizing, including occupancy-hazard design requirements;

.5 in addition to submitting shop drawings to regulatory authority as specified above, shop drawings must be approved by Owner's insurer prior to being submitted to the Consultant for review.

### 1.02 CLOSEOUT SUBMITTALS

.1 Submit a complete sprinkler system test certificate as specified in Part 3 of this Section.

### 1.03 SPARE PARTS

.1 Fill spare sprinkler head cabinet complete with spare heads.

### 1.04 QUALITY ASSURANCE

.1 Fire protection sprinkler system work is to be in accordance with following Codes and Standards:

.1 NFPA 13, Standard for the Installation of Sprinkler Systems;

.2 CSA B137.2, Polyvinylchloride (PVC) Injection-Moulded Gasketed Fittings for Pressure Applications;

.3 CSA B137.3, Rigid Polyvinylchloride (PVC) Pipe for Pressure Applications;

.4 ASTM A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless;

.5 ASTM A135, Standard Specification for Electric-Resistance-Welded Steel Pipe;

.6 ASTM A234, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service;

.7 ASTM A536, Standard Specification for Ductile Castings;

.8 ASTM A795, Standard Specification for Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use;

.9 ANSI/ASME B16.4, Grey Iron Threaded Fittings (Classes 125 and 250);

.10 CAN/CSA B64.10, Backflow Preventers and Vacuum Breakers.

.2 Fire protection sprinkler work is to be performed by a sprinkler company who is a member in good standing of the Canadian Automatic Sprinkler Association. Site personnel are to be licensed in jurisdiction of the work and under the continuous supervision of a foreman who is an experienced fire protection system installer and a journeyman pipe fitter licensed in jurisdiction of the work.

.3 Check and verify dimensions and conditions at site and ensure work can be performed as indicated. Coordinate work with trades at site and accept responsibility for and cost of making adjustments to piping and/or spacing to avoid interference with other building components.

.4 System components must be ULC listed and labelled.

.5 All grooved couplings, and fittings, valves and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.

.6 All castings used for coupling housings, fittings, valve bodies, etc., shall be date stamped for quality assurance and traceability.

1.05 DESIGN REQUIREMENTS

.1 Fire protection sprinkler work is to be designed in accordance with NFPA 13 and Provincial Standards, and, where required, local building and fire department requirements and standards of Owner's Insurer. If water

supply flow and pressure test data is not available, conduct Municipal main water flow and pressure tests at nearest fire hydrant to obtain criteria to be used in system design. Include hydrant location and flow and pressure test data with system design calculations.

.2 Include for a qualified mechanical professional engineer registered and licensed in the jurisdiction of the work to design the fire protection standpipe work. For requirements regarding Contractor retained engineers, refer to Section 20 05 10 – Mechanical Work General Instructions.

.3 Sprinkler /System Occupancy – Hazard Design requirements: In accordance with NFPA 13 occupancy-hazard density requirements, unless otherwise specified.

## 2. PRODUCTS

### 2.01 PIPE, FITTINGS, AND JOINTS

.1 Pipe, fittings, and joints are to be as follows, with exceptions as specified in Part 3 of this Section:

.1 PVC

.1 Class 200, DR14, rigid, hub and spigot pattern PVC pipe and CSA certified fittings to CAN/CSA B137.2 and B137.3 and complete with gasketed joints.

.2 Schedule 40 Steel – Grooved Coupling Joints

.1 Schedule 40 mild black carbon steel, ASTM A53, Grade B, complete with grooved ends and mechanical fittings and couplings equal to Victaulic "FireLock" fittings and Victaulic Style 009N, 107H, and 107N QuickVic and 005 rigid coupling joints. Strap type outlet fittings such as Victaulic "Snap-Let" are not acceptable.

.3 Schedule 40 Steel – Screwed and Welded Joints

.1 Schedule 40 mild black carbon steel, ASTM A53, Grade B. Screwed piping complete with Class 125 cast iron screwed fittings to ANSI/ASME B16.4. Welded piping complete with factory made seamless carbon steel butt welding fittings to ASTM A234, Grade WPB, long sweep pattern wherever possible.

.4 Schedule 10 Steel – Grooved Coupling Joints

.1 Schedule 10 mild black carbon steel, ASTM A53, Grade B, complete with grooved ends and fitings and couplings equal to Victaulic "FireLock" fittings and Victaulic Style 009N, 107H, and 107N QuickVic and 005 rigid coupling joints.

.5 Schedule 10 Steel – Screwed Joints

.1 Schedule 10 mild black carbon steel, ASTM A53, Grade B, complete with mill or site threaded ends, Class 125 cast iron screwed fittings to ANSI/ASME B16.4, and screwed joints.

.6 "Lightwall" Steel – Grooved Coupling Joints

.1 Commercial quality. "Lightwall" rolled mild carbon steel pipe to ASTM A135, Grade A, complete with a galvanized exterior, grooved ends, and fittings and couplings equal to Victaulic "Fire Lock" grooved fittings and Victaulic Style 009N QuickVic or 005 rigid coupling joints.

.7 "Lightwall" Steel – Screwed Joints

.1 Commercial quality, "Lightwall" rolled mild carbon steel pipe to ASTM A135, Grade A, ULC listed, mill or site threaded, complete with galvanized exterior, Class 125 cast iron screwed fittings to ANSI/ASME B16.4, and screwed joints.

.8 Flexible Pipe – Equal to Victaulic "VicFlex"

.1 The drop system shall consist of a braided type 304 stainless steel flexible tube, zinc plated steel 1" NPT Male threaded nipple for connection to branch-line piping, and a zinc plated steel reducer with a 1/2" or 3/4" NPT female thread for connection to the sprinkler head.

.2 Option: Victaulic FireLock IGS Groove Style 108 coupling for connection to branch-line piping, and a zinc plated steel reducer with a female thread for connection to the sprinkler head.

.3 The drop shall include a cULus/FM approved Series AH2 braided hose with a bend radius to 2" to allow for proper installation in confined spaces.

.4 The hose shall be listed for:

.1 (4) bends at 31" length;

.2 (5) bends at 36" length;

.3 (8) bends at 48" length;

.4 (10) bends at 60" length;

.5 (12) bends at 72" length.

.5 Union joints shall be provided for; ease of installation, prevention of hose torque stresses and on site changing of factory 5.75" straight reducing nipple in reduced spaces under obstructions (optional reducing nipples; 4.83" or 6.57" reducing 90 and 9" or 13" straight reducer x ½ or ¾" outlet) All VicFlex assemblies and related accessories to be installed as per the guidelines and listings in Victaulic submittal 10.85.

.6 On T Bar ceiling grid with drop in tile application, the flexible drop shall attach to the ceiling grid using a one-piece open gate Series AB1 bracket. The bracket shall allow installation before the ceiling tile is in place.

.7 On T Bar ceiling grid designed for hard lid drywall application; the flexible drop shall attach to the ceiling grid using a one-piece open gate Series AB2 bracket. The bracket shall allow for the vertical adjustment of the reducer/head from below the drywall, post drywall installation.

.8 On Hat Furring Channel grid with hard lid drywall application; the flexible drop shall attach to the ceiling grid using a one-piece open gate Series AB4 bracket. The bracket shall allow for the vertical adjustment of the reducer/head from below the drywall, post drywall installation.

.9 The braided drop system shall be cULus listed and FM Approved for sprinkler services to 175 psi (1206 kPa).

.10 For dry sprinkler heads Victaulic VicFlex dry sprinkler model VS1. The sprinkler shall provide a vertical or horizontal flexible connection with a bend radius to 2", and allow for up to 4 bends. The sprinkler body shall be die cast brass with brass deflector, supplied finished to match application and to architectural direction, and glass bulb with glycerin solution. The product shall consist of a braided type 300 stainless steel flexible hose with a swivel type branch line threaded connection, EPDM gasket seal, with PTFE-coated Beryllium Nickel and stainless-steel spring-seal assembly. The bracket shall be open gate or metal strap to provide for sprinkler placement and alignment. The flexible dry sprinkler

and bracket system is UL listed for sprinkler services to 175 psi.

.9 Copper – Solder Joint

.1 Type "L" hard drawn seamless copper to ASTM B88, complete with copper solder type fittings to ASME/ANSI B16.18 and soldered joints.

.10 CPVC Pipe

.1 Equal to IPEX BlazeMaster solvent weld, orange, SDR 13.5 pipe and Schedule 80 fittings, ULC listed for use in wet pipe automatic sprinkler systems, with a flame spread rating less than 25 and a smoke developed rating less than 50 when tested in accordance with CAN/ULC S102.2, and in accordance with NFPA 13 requirements.

.2 Victaulic Standard Mechanical Couplings: Manufactured in two segments of cast ductile iron, conforming to ASTM A-536, Grade 65-45-12. Gaskets shall be pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. Mechanical Coupling bolts shall be zinc plated (ASTM B-633) heat treated carbon steel track head conforming to ASTM A-449 and ASTM A-183. Couplings shall comply with ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

.3 Rigid Type: Coupling housings with offsetting, angle-pattern bolt pads shall be used to provide system rigidity and support and hanging in accordance with NFPA 13. Couplings shall be fully installed at visual pad-to-pad offset contact. Couplings that require exact gapping of bolt pads at specific torque ratings are not permitted.

.4 Flexible Type: Use in locations where vibration attenuation and stress relief are required. Victaulic Style 177 (Quick-Vic™), Installation ready flexible coupling.

2.02 SERVICE MAIN DOUBLE CHECK VALVE ASSEMBLIES

.1 Minimum 1205 kPa (175 psi) rated dual check valve backflow preventer assembly to CAN/CSA B64, complete with tight-closing resilient seated shut-off valves, test cocks and strainer.

.2 Manufacturers:

.1 Watts Industries Canada;

.2 Zurn/Wilkins;

.3 Apollo Valves (Conbraco Industries).

2.03 SHUT-OFF VALVES

.1 Minimum 2070 kPa (300 psi) rated full port brass or bronze body screwed ball valves and lug body or grooved end type butterfly valves.

.2 Butterfly valves shall include a pressure responsive seat, and the stem shall be offset from the disc centerline to provide complete 360-degree circumferential seating.

.3 Basis of Design: Victaulic Style 705.

.4 OS&Y Gate Valves: 1725 kPa (250 psi), grooved ends. Ductile iron body, yoke, and handwheel conforming to ASTM A-536; EPDM coated ASTM A-126-B cast iron disc; ASTM B16 brass rising stem; flanged and epoxy coated ductile iron bonnet; EPDM O-ring stem seals and body gasket. Victaulic Series 771H (Grooved ends) and Series 771F (Grooved x Flanged).

.5 Supervised closed applications:

.1 Basis of Design: Victaulic Series 707C supervised closed butterfly valve.

2.04 CHECK VALVES

.1 Minimum 1725 kPa (250 psi) resilient seat check valves, suitable for vertical or horizontal installations.

.2 Basis of Design: Victaulic Series 717.

.3 Check valves associated with Fire Department connections and fire pump test connection are to be tapped for site installation of a 20 mm (¾") diameter ball drip.

2.05 BALL DRIPS

.1 Equal to National Fire Equipment Ltd. Model #A58, 20 mm (¾") diameter automatic ball drip.

2.06 SHUT-OFF VALVE SUPERVISORY SWITCHES

.1 Tamper-proof supervisory switches, each arranged to activate a fire alarm system trouble alarm condition if the valve is closed or tampered with, each suitable in all respects for the application, and each complete with all required mounting and connection hardware.

.2 Actuator housings shall be weatherproof.

2.07 FIRE DEPARTMENT CONNECTIONS

.1 Wall mounting polished brass clapper type dual inlet Fire Department connection with two 65 mm (2-½") diameter inlets threaded to Fire Department hose requirements and equipped with caps and chains, an outlet sized as shown, and a faceplate.

.2 Faceplate is to be polished brass and complete with "AUTO-SPKR" cast-in raised lettering.

.3 Exposed metal parts of Fire Department connection are to be chrome plated.

.4 At the low point near each fire department connection, install a 90-degree elbow with drain connection to allow for system drainage to prevent freezing.

.5 Basis of Design: Victaulic #10-DR.

2.08 SPRINKLER MAIN "LOSS OF PRESSURE" ALARM SENSORS

.1 Piping mounted adjustable pressure sensor designed to actuate an alarm upon sensing a loss of pressure in the fire protection main. Switch is to be low voltage or line voltage as required.

2.09 WATER FLOW ALARM SWITCHES

.1 Pipe mounting water flow alarm switch, minimum 1725 kPa (250 psi) rated, designed to actuate two 7 A rated (at 125/250 VAC) SPDT snap action switches when water flow exceeds 0.758 L/sec. (10 Imp gpm), complete with a tamper-proof cover with conduit connection opening, a piping saddle and U-bolt, and an automatic rest pneumatic retard device with field adjustable (0 to 70 second) switch actuation delay to reduce false alarms caused by a single or series of transient water flow surges.

2.10 EXCESS PRESSURE PUMPS

.1 Close coupled, 1750 RPM, all bronze gear pump sized to maintain sufficient pressure in fire protection main to prevent alarm check valve(s) from initiating flow alarms during fluctuations in pressure of Municipal water supply. Pump is to be complete with:

.1 stainless steel shaft with maintenance free seal;

.2 lifetime lubricated carbon bearings;

.3 TEFC motor conforming to requirements specified in Section 20 05 00 – Common Work Results for Mechanical, and secured to a mounting base;

.4 accessory package consisting of flexible suction and discharge connection hoses, a Monel inlet strainer, relief valve factory set at 862 kPa (120 psi), and a steel mounting plate designed to mount pump to alarm check valve flange;

.5 power and control panel.

.2 Factory pre-wired power and control panel, CSA certified, designed to automatically start, and automatically stop pump in response to water pressure variations in the main and consisting of a surface wall mounting NEMA 2 enamelled steel panel with hinged front door equipped with Corbin catch, and following:

.1 door interlock fused disconnect with HRC fuses;

.2 protected type pump starter;

.3 door mounted H-O-A rotary selector switch;

.4 fused control transformer;

.5 115 V adjustable pressure switch to suit the application;

.6 set of NO/NC dry contacts for connection of lack of power availability alarm;

.7 door mounted "POWER ON" LED.

2.11 WATER MOTOR ALARMS

.1 Surface wall mounting water motor driven alarm device consisting of a water motor assembly with 20 mm (¾") diameter inlet and 25 mm (1") or 32 mm (1-¼") diameter drain connections, inlet strainer, a red enamelled steel exterior wall mounting strike and gong assembly, a drive shaft sleeve with drive shaft to connect water motor and gong assembly and, at the exterior gong, identification to read "SPRINKLER FIRE ALARM - WHEN BELL RINGS CALL FIRE DEPARTMENT OR POLICE".

2.12 DRY PIPE VALVES

.1 Equal to a Victaulic Series 768-NXT:

.1 Series 746-LPA accelerator quick opening device;

.2 Series 757 regulated air maintenance trim assembly;

.3 Required air pressure shall be 90 kPa (13 psig);

.4 The valve shall be externally resettable;

.5 Provide valve complete with internal components that are replaceable without removing valve from installed position;

.6 Systems requiring a quick opening device must use a regulated, tank mounted air supply;

.7 Series 757 Regulated Air Maintenance Trim Assembly.

2.13 DRY PIPE ZONE AIR COMPRESSOR

.1 Equal to a Victaulic 7C7 CSA certified, oil-less, piston type direct driven compressor with a motor conforming to requirements specified in Section 20 05 00 – Common Work Results for Mechanical, and a mounting bracket.

.2 Equal to General Air Products OLT Series, package type, oil-free, piston type, tank mounted air compressor set complete with horizontal, ASME rated and stamped steel tank with support feet, pressure gauge with gauge cock, tank drain, flexible compressor to tank and tank to piping flexible connections supplied loose for field installation, and a motor conforming to requirements specified in Section 20 05 00 – Common Work Results for Mechanical.

.3 Compressor set capacity and performance must suit final dry pipe system design and reviewed piping and sprinkler head layout shop drawings. If a larger compressor set than that specified is required, provide larger set at no additional cost, and include any additional costs for a larger size motor starter and associated wiring.

2.14 PREACTION VALVE AND ACCESSORIES

.1 Equal to Series 745 FirePac - Provide a pre-assembled [Dry] [Preaction] [Deluge] fire protection valve mounted completely within a steel cabinet for sizes 1½" [DN 40] through 8" [DN 200]. Cabinet shall be coated with red ASA-61 electrostatically applied polyester powder coating. Cabinet shall have field removable access panels on three sides to allow for ease of valve maintenance, servicing, and installation. Unit shall be UL Listed and FM-Global Approved with all materials and wiring conforming to NFPA requirements. Unit shall be provided with Series 728 ball valve or Series 705 butterfly shutoff valve with pre-wired supervisory switches, the sprinkler system fire protection valve, alarm line pressure switches, air supervisory pressure switches, alarm pressure switch and pressure gauges for proper operation and shall be pre-wired to Model RP-2001 control panel. All external electrical connections shall be able to be connected through a factory provided conduit connection to an enclosure inside of the

cabinet. Water inlet, system supply, and drain connections shall be grooved for ease of installation. Victaulic FireLock® Series 745 Fire-Pac.

.2 [Dry] [Preaction] [or] [Deluge] valve [with specified configuration], valve shall be low differential, latched clapper design with a black enamel coated ductile iron body conforming to ASTM A536, aluminum bronze clapper, stainless steel spring and shaft, EPDM diaphragm and seal, brass seat with nitrile seat o-rings. Valve internal parts shall be replaceable without removing the valve from the installed position and shall be externally resettable. 300 psi pressure rating in sizes 1½" [DN 40] through 8" [DN 200] and shall be grooved ends for vertical installation only. Victaulic FireLock® NXT [Series 768N (Preaction)] [and] [or] [Series 769N Deluge].

.3 Trim configurations:

.1 Dry Valve: Pneumatic operation.

.2 Preaction Valve:

.1 Non-interlock; [Pneumatic] [and] [or] [Electric].

.2 Single interlock; [Pneumatic] [or] [Electric].

.3 Double interlock; [Pneumatic] [and] [Electric].

.3 Deluge Valve:

.1 Electric release.

.2 Wet pilot.

.3 Dry pilot.

.4 Electric Release Panel: Notifier Model RP-2001 is a compact single enclosure unit containing power supply, two 12 amp-hr batteries and availability to have factory installed all accessory options.

.5 Options: Preassembled cabinet shall have factory options to have pipe penetrations sealed to meet NEMA 4 protection of equipment inside of the enclosure with respect to the ingress of water, whether rain, sleet, snow, splashing water or hose directed water.

.6 Options: Preassembled cabinet shall have nitrogen fill options as well as a factory installed low nitrogen pressure alarm to augment low air alarms as needed in certain trim applications.

.7 Manufacturers:

.1 Victaulic Co.;

.2 FireFlex System Inc.

.8 Smoke detectors, each complete with a red LED that pulses during normal standby conditions and illuminates steadily during an alarm condition.

.9 Surface wall mounting (to a recessed box) non-break glass pull station with test/reset key.

2.15 ZONE CONTROL RISER MODULES

.1 Equal to Victaulic Co. "FireLock" Series 747M factory assembled zone control riser modules, each complete with a painted cast ductile iron grooved end body, a ball type shut-off valve, a test and drain combination with properly sized orifice, a flow alarm switch, a pressure gauge with cock, and a pressure relief valve kit.

.2 Zone flow test and drain assembly cabinets are to be equal to National Fire Equipment Ltd. Model CV-200 recessed cold rolled steel cabinets, sized to suit assemblies, with a baked enamel finish, 18 gauge with universal knockouts for tubs, 14 gauge for doors and trim, with all metal edges ground and rounded. Doors are to be complete with:

.1 hollow channel reinforcement;

.2 full length semi-concealed piano hinge with paint stop feature and designed to permit 180° door opening;

.3 flush stainless steel door latch.

2.16 SPRINKLER HEADS

.1 Sprinkler heads, unless otherwise specified, are to be as scheduled in Part 3 of this Section.

.2 Sprinkler body shall be die-cast, with a hex-shaped wrench boss integrally cast into the sprinkler body to reduce the risk of damage during installation. Wrenches shall be provided by the sprinkler manufacturer that directly engage the wrench boss.

.3 For locations where corrosive resistant coatings are required, body shall be coated with UL listed and FM approved anti-corrosion VC-250 coating (silver coloring).

.4 Recessed sprinkler heads in finished areas are to be chrome plated unless otherwise specified. Concealed sprinkler head ceiling plates are to match ceiling colour.

.5 Where exposed pendent heads occurs in areas with suspended ceilings, they are to be complete with escutcheon plates. Similarly, sidewall heads with concealed piping are to be complete with [chrome plated] escutcheon plates.

.6 Sprinkler heads which are exposed in areas where they may be subject to damage are to be complete with wire guards, where in finished areas.

.7 Escutcheons and guards shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.

.8 Sprinkler heads located in areas or over equipment where high ambient temperature is present are to be, unless otherwise specified, 74°C (165°F) heads. All other heads, unless otherwise specified or required, are to be 57°C (135°F) rated.

.9 Manufacturers:

.1 Victaulic Co.;

.2 Tyco Fire Suppression & Building Products;

.3 The Viking Corporation;

.4 The Reliable Automatic Sprinkler Co.

2.17 SPARE SPRINKLER HEAD CABINETS

.1 Surface wall mounting, red enamelled steel, identified cabinet with hinged door, shelves with holes for mounting sprinkler heads, a wrench or wrenches suitable for each type of sprinkler head, and a full complement of spare sprinkler heads.

.2 Cabinet is to be sized to accommodate a minimum of 4 spare heads for each type of head used on the project, however, each cabinet is to be full of spare heads.

2.18 INDICATOR POST AND VALVES

.1 Cast iron, bronze trim, resilient seat, OS&Y gate valve with non-rising stem in accordance with AWWA 200W, minimum 1380 kPa (200 psi) cold water rated and complete with a square operating nut and ends to suit connecting piping.

.2 Adjustable indicator post assembly with a cast iron valve box of a length to suit valve depth and flange bolted to the valve, a cast iron lower barrel bolted to the valve box and of a length to suit valve location, and a cast iron upper housing bolted to the lower barrel and complete with wrench and operating mechanism with steel extension shaft and coupling nut sized to suit, operating handle, and valve "OPEN" and "CLOSED" identification visible through a clear polycarbonate window.

## 3. EXECUTION

### 3.01 DEMOLITION

.1 Refer to demolition requirements specified in Section 20 05 05 – Selective Demolition for Mechanical.

### 3.02 PIPING INSTALLATION REQUIREMENTS

.1 Provide required sprinkler system piping.

.2 Perform piping work in accordance with requirements of NFPA 13, governing regulations, and "Reviewed" shop drawings.

.3 Piping, unless otherwise specified, is as follows:

.1 for underground piping inside or outside building – Class 200, DR14 rigid PVC, braced and secured at bends and tees with concrete blocks in accordance with Municipal standards and details;

.2 for piping inside building and above ground except as noted below – Schedule 40 grooved end black steel with Victaulic or equal fittings and coupling joints, or, for piping to and including 50 mm (2") diameter, screwed fittings and joints, or, for piping 65 mm (2-½") diameter and larger, welding fittings and welded joints;

.3 for wet system piping inside building and above ground – at your option, CPVC sprinkler pipe and fittings;

.4 for piping downstream of "head end" alarm valve(s) and equipment – Schedule 10 or "Lightwall" black steel pipe with Victaulic or equal fittings and coupling joints or screwed fittings and joints;

.5 for branch piping to heads in suspended ceilings, etc. – at your option, flexible piping installed in accordance with manufacturer's instructions;

.6 for branch piping to heads in MRI suites – copper pipe, fittings, and sprinkler head adapters with stainless steel hangers and support hardware.

.4 Exceptions to piping requirements specified above are as follows:

.1 dry pipe zone steel piping, fittings, unions, couplings and flanges are to be galvanized;

.2 wet zone steel piping, fittings, unions, couplings and flanges for sprinkler work exposed to weather either inside or outside building (including parking garages), are to be galvanized;

.3 PVC piping is not to be used above grade;

.4 ferrous pipe hangers, supports, and similar hardware used for galvanized steel piping are to be electro-galvanized.

.5 Pipe sizes, pipe routing, sprinkler head quantities and locations, and layout of work shown on drawings are to assist during the tendering period. Ensure adequate head coverage, head quantities and pipe sizing as specified in Part 1 of this Section. Do not reduce size of sprinkler main or re-route the main unless approved by Consultant.

.6 Pipe, fittings, couplings, flanges and similar components are to be clean after erection is complete. Wire brush clean any ferrous pipe, fitting, coupling, flange, hanger, support and similar component which exhibits rust and carefully coat with suitably coloured primer.

.7 When sprinkler work is complete, test system components and overall system(s) and submit completed test certificate and other documentation in accordance with Chapter 8 of NFPA 13.

.8 Grooved joints shall be installed in accordance with the manufacturer's latest published installation instructions. Grooved ends shall be clean and free from indentations, projections, and roll marks. Gaskets shall be molded and produced by the coupling manufacturer, and shall be verified as suitable for the intended service. A factory-trained field representative of the mechanical joint manufacturer shall provide on-site training for contractor's field personnel in the proper use of grooving tools and installation of grooved piping products. The factory-trained representative shall periodically review the product installation and ensure best practices are being followed. Contractor shall remove and replace any improperly installed products.

3.03 INSTALLATION OF DOUBLE CHECK VALVE ASSEMBLY

.1 Provide a double check valve assembly in sprinkler main inside the building.

.2 Equip assembly with inlet and outlet shut-off valves with supervisory switches as specified below.

.3 Support each end of assembly from floor by means of flanged pipe supports with saddles.

3.04 INSTALLATION OF SHUT-OFF VALVES AND CHECK VALVES

.1 Provide shut-off valves and check valves in piping where shown and wherever else required.

.2 Locate valves for easy operation and maintenance.

.3 Confirm exact locations prior to roughing-in.

3.05 INSTALLATION OF SHUT-OFF VALVE SUPERVISORY SWITCHES

.1 Equip each shut-off valve with a supervisory switch.

.2 Identify each supervised valve with a 150 mm (6") square, engraved, laminated red-white plastic tag to correspond with supervised valve numbering specified and/or shown as part of the electrical work fire alarm system.

3.06 INSTALLATION OF FIRE DEPARTMENT CONNECTION

.1 Provide an exterior Fire Department connection. Confirm exact location prior to roughing-in. Confirm finish prior to ordering.

.2 Equip connection with a check valve. Equip check valve with a ball drip to drain piping between Fire Department connection and check valve, and extend drainage piping from outlet of ball drip to nearest suitable floor drain.

3.07 INSTALLATION OF LOSS OF PRESSURE SENSOR

.1 Supply and mount a pressure sensor in the fire protection piping main to activate a "LOSS OF PRESSURE" trouble alarm should Municipal water service pressure fall below the acceptable level.

.2 Locate sensor for easy access and maintenance, and set alarm pressure to suit site conditions. Confirm setting on site.

.3 Identify pressure sensor and its normal setting with a 150 mm (6") square red-white laminated plastic tag engraved to read "LOSS OF WATER PRESSURE SENSOR - NORMAL SETTING 210 kPa". Confirm wording prior to engraving.

3.08 INSTALLATION OF FLOW ALARM SWITCHES

.1 Provide water flow alarm switches in accessible locations in zone piping.

.2 Adjust to suit site water pressure conditions. Check and test operation.

.3 Identify each switch with a 150 mm (6") square red-white laminated engraved plastic tag. Confirm wording prior to engraving.

3.09 INSTALLATION OF EXCESS PRESSURE PUMP AND CONTROLS

.1 Provide an excess pressure pump in wet fire protection sprinkler system piping, arranged to prevent activation of alarm check valve water flow alarms during normal water pressure fluctuations in the main. Locate pump on a steel mounting plate assembly at alarm check valve(s) and install accessories supplied with pump. Provide a pressure gauge in valved tubing across pump suction and discharge connections.

.2 Supply a starter and control panel for pump and surface wall mount adjacent to pump. Connect panel pressure switch with copper tubing in accordance with pump manufacturer's instructions. Adjust pressure switch to suit site conditions.

.3 Start-up the pump, test operation and adjust as required.

3.10 INSTALLATION OF WATER MOTOR ALARMS

.1 Provide a water motor alarm. Secure gong on the exterior wall, impeller, and motor assembly on the interior wall, and connect with drive assembly in accordance with manufacturer's instructions. Install inlet strainer supplied loose with assembly.

.2 Provide a galvanized steel drain pipe from impeller-motor assembly down the interior wall and terminate piping back out through the wall with a 45° piping elbow and wall plate located 600 mm (24") above finished grade.

.3 Confirm exact location of alarm gong prior to roughing-in.

.4 When installation is complete, check and test alarm operation and adjust as required.

3.11 INSTALLATION OF DRY PIPE VALVES

.1 Provide dry pipe valves for zones.

.2 Connect compressed air piping to each valve, as well as all compressed air piping trim.

.3 When installation is complete, check and test valve operation and adjust as required.

.4 Provide drum drips in dry type fire protection sprinkler zone piping where shown or required. Wherever possible locate drum drips in heated areas. Where drum drips are located in unheated areas ensure trades performing thermal insulation work and electric heating cable pipe tracing work are aware of the number of drum drips required, and the size and location. Identify each drum drip. Locate drum drips in heated areas wherever possible.

3.12 INSTALLATION OF DRY ZONE AIR COMPRESSORS

.1 Provide an air compressor with air maintenance device and pressure control for the dry pipe zone and dry pipe valve. Secure compressor to a piping main by means of a mounting bracket supplied with compressor. Adjust to suit site conditions.

.2 Provide an air compressor set with receiver and secure in place on rubber-steel-rubber vibration isolation pads on a concrete housekeeping pad.

.3 Install flexible piping connections supplied loose with set.

.4 Extend valved drain piping from receiver to a floor drain.

.5 Connect receiver and control panel pressure switch with copper tubing.

.6 When installation is complete, check and test air compressor set, including automatic operation, and adjust as required.

3.13 INSTALLATION OF PREACTION SPRINKLER SYSTEMS

.1 Provide a preaction sprinkler system.

.2 Install preaction deluge valve cabinet assembly with control panel and air compressor as indicated but confirm exact location prior to roughing-in.

.3 Provide required water supply, compressed air, sprinkler, and drain piping. Terminate drain piping over a funnel floor drain.

.4 Provide detection devices and install in accordance with manufacturer's instructions. Connect to control panel with wiring in conduit.

.5 Supply detection devices and hand to electrical trade on site for installation.

.6 Include for 4 hours of on-site operation demonstration and training session. Training is to be a full review of all components including but not limited to a full operation and maintenance demonstration, with abnormal events.

3.14 INSTALLATION OF ZONE CONTROL RISER MODULES

.1 Provide zone control riser modules with drain piping where required. Terminate drainage piping over a funnel floor drain unless otherwise shown or specified. Identify each assembly.

3.15 INSTALLATION OF ZONE CONTROL RISER MODULE CABINETS

.1 Provide flush wall mounting cabinets for zone control and inspector's test connection assemblies where required in finished areas. Confirm exact locations prior to roughing-in.

.2 Identify each cabinet with a nameplate in accordance with requirements of Section 20 05 00 – Common Work Results for Mechanical.

3.16 INSTALLATION OF SPRINKLER HEADS

.1 Provide required sprinkler heads in accordance with following schedule:

| Application | Sprinkler Head Type |
|---|---|
| Rooms/areas with a suspended ceiling | Victaulic V38/V39 or Tyco Series RFII "Royal Flush II" concealed pendent<br>Victaulic V27 or Tyco Series TY-FRB recessed pendent<br>Victaulic V27 or Tyco Series TY-FRB pendent with escutcheon plates |
| Rooms/areas without a suspended ceiling | Victaulic V27 or Tyco Series TY-FRB pendent |
| Elevator shafts | Victaulic V27 or Tyco Series TY-FRB horizontal sidewall |
| Unheated exterior stairwells | Victaulic V36 or Tyco Series DS-1 dry pipe horizontal sidewall<br>Victaulic V36 or Tyco Series DS-3 wet pipe horizontal sidewall |
| Air handling system outdoor air and relief air plenums (unheated) | Tyco Series DS-3 ECOH dry horizontal sidewalls in wet piping<br>Victaulic V27 or Tyco Series TY-FRB upright or horizontal sidewall in dry pipe or anti-freeze piping |
| Unheated and unfinished areas | Victaulic V36 or Tyco Series DS-3 ECOH dry horizontal sidewall in wet piping<br>Victaulic V27 or Tyco Series TY-FRB upright or horizontal sidewall in dry pipe or anti-freeze piping |
| Heated areas with overhead doors | Victaulic V27 or Tyco Series TY-FRB horizontal sidewall |
| At non-rated windows in rated walls | Tyco Model WS horizontal and pendent vertical sidewall |

.2 Sprinkler head manufacturers indicated on schedule are for type indication purposes. Manufacturers are listed in Part 2 of this Section.

.3 Coordinate sprinkler head locations with all drawings, including architectural reflected ceiling plan drawings, and, where applicable,

electrical drawings. Coordinate sprinkler head locations in areas with suspended ceilings with the location of lighting, grilles, diffusers, and similar items recessed in or surface mounted on the ceiling as per the reflected ceiling plans. In areas with lay-in tile, centre the sprinkler head both ways in the lay-in tile wherever possible. Confirm locations prior to roughing-in.

.4 Maintain maximum headroom in areas with no ceilings.

.5 Provide guards for heads where they are subject to damage.

.6 Provide high temperature heads in equipment rooms and similar areas over heat producing or generating equipment.

3.17 INSTALLATION OF SPARE SPRINKLER HEAD CABINETS

.1 Supply a full complement (to fill cabinet) of spare sprinkler heads of types used (minimum 4 of each type) and place in a wall mounting storage cabinet located adjacent to sprinkler system "head end" equipment where later directed.

3.18 INSTALLATION OF INDICATOR POST VALVES

.1 Provide a shut-off valve in underground sprinkler main piping outside building. Equip valve with a valve box and an indicator post assembly.

.2 Confirm valve box length and steel shaft length prior to ordering and confirm exact location prior to roughing-in.

.3 When installation is complete, check and test operation of assembly and adjusts as required.

**End of Section**