

1 General

1.1 SCOPE

- .1 This specification outlines requirements for:
 - .1 New wet pipe sprinkler systems.
 - .2 New double interlock preaction sprinkler system for secure rooms.
 - .3 Valve header.
 - .4 Fire extinguishers.

1.2 RELATED WORK

- .1 Division 1.
- .2 Division 9.
- .3 Division 20.
- .4 Division 23.
- .5 Division 26.
- .6 Division 28.
- .7 This contractor is cautioned to review the drawings and specifications of other trades for work relating to this trade.

1.3 CONTRACT DRAWINGS

- .1 Refer to Mechanical Index Sheet for list of drawings.

1.4 REGULATIONS

- .1 The installation of the fire suppression systems shall be in accordance with the drawings issued under this contract, these specifications, and;
 - .1 The National Building Code of Canada 2010.
 - .2 The National Fire Code of Canada 2010.
 - .3 The National Plumbing Code of Canada 2010.
 - .4 NFPA 10-2010, "Standard for Portable Fire Extinguishers".
 - .5 NFPA 13-2013, "Standard for the Installation of Sprinkler Systems".
 - .6 NFPA 25-2010, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems".

1.5 COMPONENTS

- .1 All system components required to be "listed" as per NFPA shall have their listing through Underwriter's Laboratories of Canada (ULC).

1.6 AUTHORITY HAVING JURISDICTION

- .1 The system is to be approved by the "Authority Having Jurisdiction": Departmental Representative.

1.7 REVIEW AUTHORITY

- .1 The working drawings are to be reviewed by the Departmental Representative. Any comments shall be directed to the Departmental Representative for review and action.

1.8 SUBMISSIONS

.1 Working Drawings

- .1 Shall be submitted in strict accordance with NFPA 13.
- .2 Floor plan drawings shall be in 1:100 scale and show required pipe routing, valves, sprinklers, other system components, etc.
- .3 Plot plan showing underground services, siamese connections, and access routes.
- .4 Cross sections of building showing floors, ceilings, attics, and sprinkler system components.
- .5 Submit updated drawings at regularly scheduled job meetings or as requested by the Departmental Representative during construction.
- .6 Working drawings shall be submitted to the Departmental Representative for review and acceptance. Work shall commence only when all submissions have been reviewed by the Departmental Representative. Allow 10 working days for the Departmental Representative's review of each submission.
- .7 Confirmation of full time foreman's name and provincial certification.
- .8 The working drawings and hydraulic calculations shall be submitted as one package.
- .9 All drawings shall be submitted as described above and in AutoCAD 2014 (or above) format complete with electronic copy of each drawing.
- .10 Complete catalogue information for devices/equipment specified.
- .11 Hydraulic calculations shall be in imperial units. Calculations to include node drawings.
- .12 Calculations and drawings are to show volumes of pre-action system.
- .13 Submit electric copies of each for review in .pdf format in accordance with 01 10 01 – General Requirements.

.2 As-Built (Record) Drawings

- .1 As-built drawings shall represent the installed system components.
- .2 Submit as-built drawings with maintenance manuals two weeks prior to substantial completion.
- .3 During system installations, the Trade Contractor shall note any substantial variances from the working drawings, and shall record these variances in red pencil on a "reviewed" working drawing. This drawing shall have no other markings and shall be available for review at all times on site.
- .4 The Trade Contractor shall submit up-to-date, accurate as-built drawings (based on the marked-up working drawings, site revisions, and contract changes) for the complete systems and any ancillary equipment.
- .5 The Trade Contractor shall provide as-built drawings (folded prints) for each maintenance manual.
- .6 As-built drawings to be provided in AutoCAD 2014 (or above) format complete with electronic copy of each drawing.

.3 Operation and Maintenance Data

- .1 The Trade Contractor shall provide three (3) hard copies and one electronic copy of operation and maintenance information in a 3 ring binder and drawings. Information in each binder is to include:
 - .1 Copy of reviewed (stamped) product data.
 - .2 Detailed periodic inspection and tests schedule per the requirements in NFPA 25.
 - .3 Copy of as-built drawings (folded prints) and electronic file on CD.
 - .4 Copy of this specification section.
 - .5 Copy of material and test certificate for sprinkler systems and backflow preventer. It is the responsibility of the Trade Contractor to forward the test certificates to the Departmental Representative.
 - .6 Letter identifying Contractor's maintenance and warranty obligations.
 - .7 Letter from local fire department accepting threads on fire department connection.
 - .8 Copy of hydraulic calculations complete with node drawings.
 - .9 Copy of pressure settings for all switches.
 - .10 Material and Testing certificate for new water entrance.
 - .11 Copy of information sign for auxiliary drains/low point drain locations.
 - .12 Copy of Verification report for pre-action releasing panel.
- .2 Binders are to include an index and dividing tabs for each section.
- .3 Submit maintenance manuals two weeks prior to substantial completion.

1.9 TRADE CONTRACTOR

- .1 Only Trade Contractors competent in the installation of sprinkler systems and who have a thorough and demonstrated knowledge of requirements in NFPA 13 and NFPA 25 will be considered acceptable for this contract.
- .2 The Trade Contractor shall assign an on-the-job full-time foreman who has a sprinkler Journeypersons license. All employees working on site must hold a valid certification of qualification or a valid letter of authenticity in the occupation. Contractors are required to ensure that their workers are certified in accordance with the Apprenticeship and Trade Qualifications Act and General Regulations.

1.10 SPARE PARTS

- .1 The Trade Contractor shall provide spare sprinklers (12 of each type, except dry sprinklers) and a sprinkler wrench(s). A lockable metal cabinet(s) sized to accommodate the spare sprinklers and wrench(s) shall be provided and mounted on the wall adjacent to the header in the sprinkler room.
- .2 Provide additional spares as required to meet NFPA requirements.

1.11 WARRANTY

- .1 The equipment and installation shall be under full labour and material warranty for a period of 12 months from certification.

1.12 CERTIFICATION

- .1 The Trade Contractor shall complete Material and Test Certificates for each system in accordance with NFPA 13.
- .2 The Trade Contractor shall complete Material and Test certificate for the new water entrance piping as per NFPA 13. This work shall be coordinated with the underground piping contractor. Provide Material and Testing Certificate for review.
- .3 The Trade Contractor shall complete a test certificate for the backflow preventer. Certification to be by an individual approved by the Municipality of Saint-Léonard.
- .4 The releasing panel shall be verified in accordance with ULC Standards. Submit test report and verification letter.
- .5 Certification date shall be as posted on certificate unless otherwise directed by the Departmental Representative.

1.13 DESIGN

- .1 The Departmental Representative has designed the sprinkler system for the purpose of tendering.
- .2 The Trade Contractor shall prepare detailed design/working drawings following a detailed drawing review and coordination.
- .3 The Trade Contractor shall install the system based on the design intent, but is responsible for confirming pipe routes and sprinkler head locations. Any necessary changes shall be the responsibility of the Trade Contractor and must be approved by the Departmental Representative.
- .4 The Trade Contractor shall prepare hydraulic calculations matching the installation (shop) drawings.
- .5 Any changes to piping or sprinkler head locations or type that, in the opinion of the Departmental Representative, significantly alter the hydraulic design, will require confirming hydraulic calculations by this Contractor.
- .6 Refer to tender drawings for hazard table.
- .7 The fire alarm zoning shall match the sprinkler system zoning.
- .8 The pre-action system shall be electric-pneumatic, double interlock pre-action, using smoke detection to trigger the electric interlock of the pre-action system.
- .9 A flow test connection shall be installed above the pre-action valve to permit testing of the valve without flowing water into the system piping. Water shall discharge to a suitable floor drain.
- .10 Schedule 40 galvanized piping with cut grooves shall be used for all pre-action system piping.
- .11 The following design criteria shall be met:
 - .1 Wet system light hazard areas (e.g. offices, rooms, corridors) are to be designed to a density of 4.1 L/min/m² over a minimum of 83.6 m² and shall include a 378 L/min hose allowance.

- .2 Ordinary Hazard, Group 1 areas (e.g. storage, kitchen, mechanical penthouse, service rooms) are to be designed to a density of 6.1 L/min/m² over a minimum of 103 m² and shall include a 946 L/min hose allowance.
- .3 The pre-action system ordinary hazard group 2 areas (e.g. secure rooms) are to be designed to a density of 8.1 L/min/m² over the entire area of the room and shall include a 946 L/min hose allowance.
- .4 The system area of operation is permitted to be reduced per NFPA 13 for use of quick response sprinklers where ceiling heights are less than 6.1 m in height. The hydraulic calculation cover sheet shall indicate ceiling height.

1.14 SYSTEM DESCRIPTION

- .1 This contract includes work identified on the contract drawings and specifications.
- .2 The following shall be included for each wet pipe sprinkler zone.
 - .1 Control valve complete with tamper switch.
 - .2 Flow switch.
 - .3 Test and drain assembly, complete with pressure relief.
 - .4 Listed pressure gauges.
- .3 The following shall be included with the riser check valve:
 - .1 Riser check valve.
 - .2 Control valve complete with tamper switch.
 - .3 Listed pressure gauges.
 - .4 System header piping.
 - .5 Main drain valve and all drain piping.
 - .6 Installation and instruction manuals.
- .4 The following shall be included for the pre-action pipe sprinkler system.
 - .1 Pre-action valve complete with electric/pneumatic trim.
 - .2 Control valves complete with tamper switch.
 - .3 Alarm switch.
 - .4 Low air supervisory switch.
 - .5 Air maintenance device.
 - .6 Air compressor complete with tank.
 - .7 Listed pressure gauges.
 - .8 Main drain valve and all drain piping.
 - .9 Remote inspector's test connection.
 - .10 Quick opening device (if required).
 - .11 Drum drip located in heated space and low point drain piped to floor drain, janitor's sink or exterior.
 - .12 Solenoid valve and connection to releasing panel.
- .5 Identification tags shall be fastened to control valves and clearly indicating the appropriate system.
- .6 Hydraulic data nameplate for each system.
- .7 The systems shall be designed not to exceed 1,200 kPa working pressure.

1.15 DESIGN CRITERIA

- .1 Water supply for the sprinkler system shall be based on the municipal water supply.

- .2 A hydraulic model analysis shows a static pressure of 669 kPa with 3414 L/min at 282 kPa and 4053 L/m at 138 kPa at Rue akerley using a 200 mm water entrance to the building.
- .3 The Contractor is to perform a water flow test confirming the municipal supply prior to start of work. These results are to be used for the design and shop drawings of the sprinkler system.
- .4 Calculations are to be based on 85% of the municipal supply.

1.16 SUSTAINABLE DESIGN SUBMITTALS

- .1 Construction waste management plan.
 - .1 A Construction Waste Management Plan is in place to divert waste material from landfill. Wherever practical, send waste material for reuse or recycling, and generally document this for the contractor's waste management final report.
- .2 Recycled Content.
 - .1 Refer to Section 01 47 15 - Sustainable Requirements for "List of Products Requiring Recycled Content".
 - .2 If products within this section are indicated on the "List of Products Requiring Recycled Content", only products with recycled content will be acceptable.
 - .3 For products not identified on list, source products with highest recycled content available when practical.
 - .4 Include following information with product data submission.
 - .1 Percentage of pre-consumer and post-consumer recycled content for each product.
- .3 Regional Materials.
 - .1 Refer to Section 01 47 15 - Sustainable Requirements for "List of Products Required to be Locally Sourced".
 - .2 If products within this section are indicated on the "List of Products Required to be Locally Sourced", include following information with Product Data submission:
 - .1 Extraction/Manufacturing location(s): Indicate location of extraction site or manufacturing plant, and indicate distance between extraction site or manufacturing plant and Project site.
- .4 Adhesives and Sealants.
 - .1 Include following information with Product Data submission for materials specified under this section:
 - .1 Submit manufacturer's certification indicating VOC limits of Products used onsite and within the building envelope. Product shall comply with California's SCAQMD #1168.
- .5 Paints and Coatings.
 - .1 Provide low VOC Products as specified herein and complying with local regulations regarding toxic and hazardous materials.
 - .2 Ensure primers, paints and coatings used onsite and within building envelope meet or exceed requirements of following standards:
 - .1 Interior and Exterior Paints: GS-11
 - .2 Anti-Corrosive Paint: GS-11

- .3 Clear Wood Finishes and other coating not covered in GS-11: SCAQMD #1113.
- .3 Submit manufacturer's certification indicating VOC limits of Products.
- .6 If requesting substitute product, ensure proposed substitution achieves above stated goals.

1.17 MAX. VOC CONTENT FOR SOLVENT CLEANING ACTIVITIES

- .1 Following are some of the Maximum allowed VOC Content for following activities, as per SCAQMD Rule 1171-9 (refer to SCAQMD manual for complete list and updates):
 - .1 Product cleaning during onsite surface preparation for coatings or adhesives application, and repair and maintenance cleaning:
 - .1 General maximum VOC 25g/L.
 - .2 Electrical apparatus components and electronic components.
 - .3 Cleaning of coatings or adhesives application equipment max. VOC 25g/L.
 - .2 Refer to SCAQMD for additional information and clarification and complete list of applications.
 - .3 Any discrepancies are to be approved by Departmental Representative. Obtain written approval prior to use on site.

2 Products

2.1 SPRINKLERS

- .1 All sprinklers shall be manufactured by one manufacturer, except as noted.
- .2 Sprinklers:
 - .1 Viking Microfast quick response upright and semi-recessed pendant sprinkler
Temperature 68°C, 93°C, 141°C
15 mm orifice
k = 80.6 (5.6)
Brass finish for uprights, chrome finish for pendants.
 - .2 Viking quick response semi-recessed dry pendent sprinklers
Temperature 68°C, 93°C
k = 80.6 (5.6)
Chrome finish
 - .3 Viking Institutional Style quick response standard/extended coverage flush pendent sprinklers Model HQR-2 (No alternates)
Temperature 74°C, 93°C
15 mm orifice
k = 80.6 (5.6)
Chrome finish chrome cover plate
Only Approved Components: Base - Viking No. 10554; Sprinkler Identification No. - VK410; Escutcheon Package Base Part No. - 10627.
 - .4 Viking Microfast quick response horizontal sidewall sprinkler
Temperature 68°C, 141°C
15 mm orifice
k = 80.6 (5.6)
Chrome finish

- .5 Tyco model SW-20 (TY5332) standard response sidewall sprinkler (Ordinary Hazard Group 2)
Temperature 68°C, 93°C
k = 161.3 (11.2)
Chrome finish
No alternates allowed.
- .3 Alternates meeting above noted criteria are acceptable: Reliable, Victaulic, and Tyco. No alternates are allowed for institutional pendant and standard response sidewall sprinklers.

2.2 PIPING AND FITTINGS

- .1 Piping shall satisfy the following criteria:
 - .1 Wet System steel pipe shall be of the type tested for sprinkler use as per NFPA 13 and meet the requirements of ASTM 795 or ASTM 135. All pipe to be manufactured in North America. All pipe must be stored inside prior to installation and have zero corrosion.
 - .2 Schedule 40 galvanized (ASTM A53, Grade A) piping for all new pre-action system piping and for pipe penetrating exterior walls. Galvanized pipe shall be dipped at the factory. Galvanized piping is to be cut grooved.
 - .3 Schedule 40 black steel for pipe 50 mm and smaller on wet systems only.
 - .4 Schedule 10 black steel for pipe greater than 65 mm on wet systems only.
 - .5 Concealed pipe shall have red and white decals indicating sprinkler system piping every 3 m along mains and risers. Brady type or equivalent.
 - .6 Acceptable Products: Bull Moose, Allied, Wheatland, and Youngstown.
 - .7 All sprinkler piping to be of one manufacturer.
- .2 Fittings shall satisfy the following criteria:
 - .1 Piping 65 mm and greater in diameter to be grooved.
 - .2 Piping 50 mm and smaller to be threaded or grooved.
 - .3 All dry system piping shall be cut grooved (not rolled grooved).
 - .4 All dry system pipe cut ends and cut grooves shall be painted with a high zinc content anti-corrosion coating.
 - .5 Fittings are to withstand 1200 kPa working pressure.
 - .6 All fittings to meet requirements as per NFPA 13. All fittings to be stored inside prior to installation, and have zero corrosion.
 - .7 Screwed fittings on all dry system and to the exterior to be galvanized.
 - .8 Gaskets on dry system shall be listed for dry systems.
 - .9 Acceptable Products (Grooved): Victaulic, Shurjoint, and Tyco.
 - .10 Acceptable Products (Screwed): Ward, BMI, and Anvil Star.
 - .11 All fittings to be of one manufacturer.
- .3 Flange bolts shall be square or hexhead bolts with heavy hex nuts to ASTM A307-82a.
- .4 Flange gaskets shall be 1.6 mm thick plain or cloth inserted red rubber to ANSI B16.20-2007 and ANSI B16.21-2011.
- .5 Tie rods shall be a minimum of 16 mm.
- .6 No site welding.
- .7 Exposed hangers shall have collars/plates at ceilings.

- .8 Only one manufacturer shall be used.

2.3 CONTROL VALVES

- .1 Only one manufacturer's valves shall be used.
- .2 Valves to be ULC listed.
- .3 Valves shall bear:
 - .1 Manufacturer's name.
 - .2 Trademark.
- .4 Valves controlling water supply to any part of the fire suppression systems shall be:
 - .1 65 mm and greater: Victaulic Butterfly Model 705 complete with tamper switch.
 - .2 50 mm and under: Victaulic Model 728 with tamper switch.
 - .3 Normally closed valve: Victaulic Model 707 complete with tamper switch.
- .5 Acceptable Alternates: Milwaukee, Grinnell-Gruvlok, Jenkins, Nibco, Mueller, Kennedy, Global Safety Products, and Fivalco.

2.4 PRE-ACTION SYSTEM

- .1 The following shall be included with the double interlock pre-action system:
 - .1 Pre-action valve.
 - .2 Solenoid valve.
 - .3 Control valves complete with tamper switch.
 - .4 Alarm switch.
 - .5 Low air supervisory switch.
 - .6 Connection to air compressor and associated piping.
 - .7 Check valve with rubber seat.
 - .8 Pressure gauges.
 - .9 System header piping.
 - .10 Main drain valve and all drain piping.
 - .11 Installation and instruction manuals.
 - .12 All associated trim for electric/pneumatic releasing system.
 - .13 Alarm test valve.
 - .14 Manual emergency release.
 - .15 Pressure operated relief valve.
 - .16 Quick opening device (if required).
 - .17 Pressure relief valve installed between the control valve and preaction valve.
 - .18 Air maintenance device.
 - .19 Air compressor.

- .2 Acceptable Products: Tyco, Reliable, Viking, and Victaulic.

2.5 SPRINKLER TAMPER SWITCH

- .1 Switches for butterfly and ball valves. Refer to Section 2.3.
- .2 Acceptable Products: System Sensor and Potter.

2.6 CHECK VALVE

- .1 Viking Model G-1 swing check valve complete with 12 mm ball drip.
- .2 Acceptable Alternates: Reliable, Victaulic, and Tyco.

2.7 AIR COMPRESSOR

- .1 Contractor to determine volume of system and provide a new air compressor complete with tank for the dry pipe system. Locate in water entrance room adjacent to dry pipe valve.
- .2 Contractor to provide all materials for compressor operation, including any required starter-on switch, electrical connection only will be by Division 26.
- .3 Air compressor shall be capable of restoring normal air pressure in system within 30 minutes.
- .4 Compressor to be 208 volt, 3 phase.

2.8 PIPE HANGERS

- .1 Piping shall be supported by hangers as per NFPA 13.

2.9 INSPECTOR'S TEST CONNECTION/DRAINS

- .1 AFG test-and-drain Model 1011T (pre-manufactured) complete with pressure relief at zone control valve.
- .2 Control valve, listed pressure gauge, reducing orifice, and galvanized pipe to exterior for remote test connections.
- .3 Acceptable Alternate: Victaulic.

2.10 AIR MAINTENANCE DEVICE

- .1 Viking Model D-2 complete with by-pass trim.
- .2 Acceptable Alternates: Tyco, Reliable, and Victaulic.

2.11 SPRINKLER HEAD GUARDS

- .1 Guards shall be listed for installation with installed sprinkler heads.
- .2 Acceptable Alternates: Reliable, Viking, Victaulic, and Tyco.

2.12 SPRINKLER HEAD CABINETS

- .1 Lyn-Car F30-5622.
- .2 Acceptable Alternates: Reliable, Victaulic, Viking, and Tyco.

2.13 IDENTIFICATION TAGS

- .1 Required for all control valves, drain valves, inspector's test connections, trim valves, and auxiliary drain valves.
- .2 Identification tags on inspector's test connections and auxiliary drain valves shall be red lamicoid with white letters.
- .3 Identification tags shall be red lamicoid with white lettering.
- .4 Provide additional tags on t-bar ceiling where valves are located above.
- .5 All tagging shall be bilingual.

2.14 ALARM SWITCH

- .1 Potter PS-10A.
- .2 Alarm switch compatible with the system preaction valve.
- .3 Acceptable Alternate: System Sensor.

2.15 QUICK OPENING DEVICE

- .1 Viking Model D-2, complete with anti-flooding device.
- .2 Acceptable Alternates: Reliable, Victaulic, and Tyco.

2.16 FIRE DEPARTMENT PUMPER CONNECTION

- .1 National Fire Equipment Model 229, flush mounted, 100 mm x 65 mm x 65 mm double clapper inlet complete with chrome caps and chain.
- .2 Threaded connection to match local fire department requirements.
- .3 Exterior plate and cover shall have chrome finish and read "Sprinkler System".
- .4 Acceptable Alternates: Canadian Fire Hose and Wilson & Cousins.

2.17 LOW AIR PRESSURE SWITCH

- .1 Potter PS-40A.
- .2 Acceptable Alternates: System Sensor.

2.18 RISER CHECK VALVE

- .1 Viking Model F-1 complete with trim.
- .2 Acceptable Alternates: Reliable, Victaulic, and Tyco.

2.19 SPRINKLER FLOW SWITCH

- .1 Potter VSR-F vane type water flow switch with retard complete with cover tamper switch kit.
- .2 Acceptable Alternate: System Sensor.

2.20 PRESSURE GAUGES

- .1 Provide and install a listed 100 mm pressure gauge on all test connection assemblies for each zone at valve headers and air compressor.
- .2 Acceptable Products: Reliable, Viking, Tyco, Victaulic, Winters, and Lyn-Car.

2.21 HYDRAULIC DATA NAMEPLATES

- .1 Hydraulic nameplate signs.

2.22 PORTABLE FIRE EXTINGUISHER

- .1 Stored pressure dry chemical, 10 lbs, ABC type.
- .2 Carbon dioxide, 10 lbs, for electrical rooms.
- .3 Provide wall mounting brackets for all extinguishers, except for those in cabinets. Refer to contract drawings.
- .4 Acceptable Products: Badger, National Fire Equipment, Lyn Car, Pyrene, Wilson and Cousins, Canadian Fire Hose, and Flag.

2.23 FIRE EXTINGUISHER CABINET

- .1 National Fire Equipment Model CE-950-3-2 semi-recessed canopy type.
- .2 Suitable for 10 lbs ABC type fire extinguisher.
- .3 Factory primed, to be ready for paint.

2.24 DOUBLE CHECK VALVE BACKFLOW PREVENTER

- .1 WATTS Silver Eagles Series 757 complete with test cocks, butterfly valves, and tamper switch at water entrance.
- .2 Acceptable Alternates: Ames and Wilkins.

2.25 BACKFLOW PREVENTER TEST HEADER

- .1 Exterior wall plate to be brass finish and read "BACKFLOW TEST" complete with 65 mm hose valves, caps, and chains.
- .2 Test header to be sized to permit flow equal to greatest system demand for existing building.
- .3 Test header is not required if Contractor can verify discharge through 50 mm drain in hydraulic calculations.
- .4 Acceptable Products: National Fire Equipment, Wilsons & Cousins, and Canadian Fire Hose.

2.26 INFORMATION SIGN OF DRY SYSTEM AUXILIARY DRAINS AND LOW POINT DRAIN LOCATIONS

- .1 The location of all dry system auxiliary drains and low point drains shall be clearly indicated on a permanently marked metal or rigid plastic information sign.

- .2 The information sign shall be permanently installed at the dry pipe valve with corrosion resistant chain or wire.
- .3 The sign shall clearly indicate the following information:
 - .1 The location of the area served by the dry system.
 - .2 The location of each auxiliary drain and low point drain.

2.27 COLD GALVANIZING COMPOUND

- .1 All galvanized piping cut ends, cut grooves, and threaded grooves shall be painted with a cold galvanizing compound per manufacturer's requirements.
- .2 Acceptable Product: Z.R.C. cold galvanized compound for iron and steel.

3 Execution

3.1 APPROVALS

- .1 Working (shop) drawings and hydraulic calculations shall be reviewed by the Client Fire Marshall and Departmental Representative prior to any fabrication, ordering of material or site work.

3.2 SITE VISIT

- .1 Do not recess, paint or conceal piping, accessories, or work prior to site visit and approval by the Departmental Representative.

3.3 INSTALLATION

- .1 All system components to be installed as per the shop drawings, these specifications and the manufacturer's recommendations.
- .2 Install control valves, drain valves, and inspector's test sight glass in a manner that will allow for easy access and use.
- .3 Contractor shall allow for pipe routing to suit obstructions.
- .4 Install drains with slopes to allow for proper draining. Where more than one sprinkler system drain is located in an area, they shall be interconnected so that only one pipe exits the building.
- .5 Provide/install chrome collars around pipe at all penetrations where exposed.
- .6 Quick Response sprinklers to be installed throughout all areas except where noted on the drawings.
- .7 Drum drips shall be installed on all trapped sections of the pre-action system. Drum drips are to be installed in heated areas and locations confirmed with Departmental Representative prior to installation.
- .8 Install guards on all sprinkler heads where possible damage could occur.
- .9 All dry sprinkler heads to be installed from tee connections.
- .10 Locate spare sprinkler head cabinet at the water entrance room and hydraulic data nameplates at the respective valve header.

- .11 Intermediate or high temperature classification sprinklers to be installed in mechanical/electrical rooms.
- .12 All pipes draining to exterior shall be located a maximum of 610 mm (2' - 0") above grade and discharge on a 610 mm x 610 mm (2' - 0" x 2' - 0") concrete patio stone.
- .13 Provide and install sprinkler protection below obstructions in all rooms as required.
- .14 Portable fire extinguishers on wall brackets and in wall cabinets are to be installed by the General Contractor.
- .15 The semi recessed fire extinguisher cabinets shall be installed so as to maintain the fire rating of the wall assembly they are located in.
- .16 Supply and install the following:
 - .1 Fire department pumper connection complete with valves, fittings, and wall plate.
 - .2 A riser check valve at the header complete with pressure gauges and main drain. Valve to be monitored by the fire alarm system for "low water pressure".
 - .3 Pre-action pipe valve complete with trimmings, air compressor, switches, quick opening device, and air maintenance device. Valves to be monitored by the fire alarm system for "low air pressure" and "water flow".
 - .4 Air filled gauges can be used at the valve headers and remote test locations.
 - .5 A backflow preventer complete with valves and tamper switches at the water entrance.
 - .6 A backflow preventer test header near the water entrance room. Refer to Item 2.26.
- .17 Install high temperature classification sprinkler heads where located within a 2,135 mm radius of unit heater.
- .18 All sprinklers are to be centered on ceiling tiles unless shown otherwise on drawings.
- .19 Provide and install information sign for dry system auxiliary drain/low point drain locations at attic dry valve location.
- .20 Provide sprinkler protection under stairs.
- .21 Locate dry system drum drips and remote inspector's test connection in suitable ceiling space or area approved by Departmental Representative. Interconnect piping to exterior where applicable.
- .22 All dry system piping shall be cut grooved. All dry system cut ends and cut grooves shall be painted with a high zinc content anti-corrosion coating.
- .23 Provide intermediate temperature sprinklers where located within 300 mm from ceiling mounted radiant heating panel.
- .24 Install new pre-action valve complete with trim, quick opening device, air maintenance device, solenoid valves, switches, and dry pilot actuator.
- .25 Contractor to install a pressure operated relief valve between the control valve and pre-action valve. Valve to relief at 1173 kPa (170 psi).
- .26 Pre-action and dry system piping shall be pitched at 1/2" per 10'-0".

3.4 FIRE STOPPING

- .1 The General Contractor is responsible for fire stopping. All penetrations through all separations (with and without fire resistance rating) shall be fire stopped per NBC.

3.5 TESTING AND TRAINING

- .1 Trade Contractor shall subject all system components to operational and hydrostatic tests as per NFPA 13. Repair any leaks or defective piping that should occur during the tests.
- .2 Trade Contractor shall provide hydraulic pump, temporary connections, and labour required to perform tests.
- .3 Training of the building's maintenance staff shall be completed prior to functional testing with the Departmental Representative. Provide one, 2 hour session for this training.
- .4 The Trade Contractor shall then conduct a full system functional test in the presence of the Departmental Representative. Provide foreman for 8 hours for this testing. The purpose of the test will be to verify the operation of the equipment. Ten (10) days notice shall be given before any functional testing. Coordinate test time with Fire Alarm and Electrical Contractors.
- .5 Trade Contractor shall issue completed Material and Test Certificates for the sprinkler systems and backflow preventer.
- .6 Refer to Section 01 91 13, "General Commissioning Requirements" for additional information.

3.6 CUTTING, CORE DRILLING, PATCHING, AND PAINTING

- .1 All cutting, core drilling, patching, and painting shall be the responsibility of the General Contractor.
- .2 All exposed sprinkler piping and fittings, with the exception of attic spaces, shall be primed and painted (anti-corrosion paint) with four (4) coats in total on site. Confirm with Departmental Representative on color.
- .3 Apply decals.
- .4 This work shall be coordinated prior to tender close and during construction.

3.7 COORDINATION

- .1 Location of piping and equipment shall be closely coordinated with plumbing, ventilation, heating, electrical, and structural systems to avoid interference.
- .2 Sprinkler head locations are to be coordinated with all other services and ceilings.
- .3 The complete tender package shall be used to coordinate the sprinkler system installation.
- .4 Coordinate flushing of the underground with underground piping contractor.

3.8 SITE VISIT REPORTS

- .1 Site visit reports as issued by the Departmental Representative are to be signed-off by the Contractor when the deficiency is completed. Reports to be issued, with signature, to the Departmental Representative and Commissioning Agent for their review.

3.9 COMMISSIONING

- .1 After start-up, test, adjust and prove operation of all equipment and accessories to suit site conditions and 01 91 13 General Commissioning Requirements.

END OF SECTION