

PART 1 - GENERAL

- 1.1 GENERAL .1 Refer to Section 23 05 00 for the requirement for Contractor provided coordination shop drawings. Coordinate and cooperate with the production of these drawings and note that the installation of mechanical systems shall not commence until the drawings have been reviewed by Departmental Representative.
- 1.2 RELATED WORK .1 Submittal Procedures: Section 01 33 00
- .2 Contract Closeout: Section 01 78 00
- .3 Commissioning: 01 91 13
- 1.3 EQUIPMENT LIST .1 Complete a list of equipment and materials to be used on this project, and forming part of the tender including manufacturer's name, model number and details of materials, and submit for approval.
- .2 Submit for approval within ten (10) days after award of contract.
- 1.4 ALTERNATES .1 The equipment listed on the project equipment schedules is the "basis of design equipment", the Contractor is permitted to find alternates to this equipment that meet the technical and quality requirements of the project specifications. If there are necessary changes to the building systems to accommodate these alternates, the changes shall be coordinated and provided by the Contractor at no additional cost to the Owner.
- 1.5 TRIAL USAGE .1 Departmental Representative may use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .1 Trial usage to apply to systems only after prior approval of Departmental Representative.
- .2 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed. Mount sample on 12 mm plywood
-

- 
- |                                       |    |   |
|---------------------------------------|----|---|
| <u>1.5 TRIAL USAGE<br/>(Cont'd)</u>   | .2 | Submit for approval:(Cont'd)<br>board. Affix typewritten label beneath sample<br>indicating service.  |
| <br>                                  |    |   |
| <u>1.6 PROTECTION<br/>OF OPENINGS</u> | .1 | Protect equipment and systems openings from dirt,<br>dust, and other foreign materials with materials<br>appropriate to system.   |
|                                       | .2 | Seal all ductwork openings with 6 mil plastic to<br>protect it from dirt, dust, and foreign materials<br>during the course of the day's installation. Further<br>ensure that at the end of the day, all open joints<br>are closed off. Tape all plastic with duct tape.<br>Cover and protect all un-installed ductwork before it<br>is installed.   |
|                                       | .3 | Protect all existing ductwork to be re-used, closing<br>off openings with 6 mil plastic.  |
| <br>                                  |    |   |
| <u>1.7 PAINTING</u>                   | .1 | To Section 09 91 23 Interior Painting.  |
|                                       | .2 | Prime and touch up marred finished paintwork to<br>match original.  |
|                                       | .3 | Restore to new condition, finishes which have been<br>damaged too extensively to be merely primed and<br>touched up.  |
| <br>                                  |    |   |
| <u>1.8 SPARE PARTS</u>                | .1 | Furnish spare parts in accordance with Section 01 78<br>00 as follows:<br>.1 One (1) set of belts for each piece of<br>machinery.<br>.2 Three (3) sets of filters for each filter bank.<br>.3 One (1) glass for each gauge glass.<br>.4 One (1) set of packing seals for each pump.<br>.5 Two (2) pressure gauges and two thermometers<br>for each type and range used on the project.<br>.6 Keys for vandal resistant outlets. |
| <br>                                  |    |   |
| <u>1.9 SPECIAL TOOLS</u>              | .1 | Provide one set of special tools required to service<br>equipment as recommended by manufacturers and in<br>accordance with Section 01 78 00.   |
|                                       | .2 | Furnish one commercial quality grease gun, grease<br>and adapters to suit different types of grease and<br>grease fittings.   |
-

1.10 DEMONSTRATION  
AND OPERATING AND  
MAINTENANCE  
INSTRUCTIONS

- .1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, troubleshooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .2 Where specified elsewhere in Divisions 21, 22 and 23, manufacturers to provide demonstrations and instructions.
- .3 In addition to where training is specified elsewhere in other divisions, factory trained personnel shall provide on-site instruction in operation and maintenance as follows:
  - .1 Ventilation Systems - minimum four (4) hours.
  - .2 Heating Systems - minimum four (4) hours.
  - .3 Plumbing Systems - minimum two (2) hours.
  - .4 Fire Protection Systems - minimum two (2) hours.
  - .5 Control System - minimum two (2) days.
- .4 Use operation and maintenance manual, as-built drawings, audio visual aids, etc. as part of instruction materials.

1.11 CLOSEOUT  
SUBMITTALS

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00.
- .2 Operation and maintenance manual to be approved by Departmental Representative and final copies deposited with Departmental Representative before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for each system including environmental controls.
  - .2 Description of each system and its controls.
  - .3 Description of operation of each system at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for each system and each component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .4 Maintenance data shall include:
  - .1 Servicing, maintenance, operation and troubleshooting instructions for each item of equipment and parts list.

1.11 CLOSEOUT  
SUBMITTALS  
(Cont'd)

- .4 Maintenance data shall include:(Cont'd)
  - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:
  - .1 Equipment manufacturer's performance data sheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified elsewhere.
  - .4 Testing, adjusting and balancing reports as specified in Section 23 05 95 Testing, Adjusting and Balancing.
- .6 Approvals:
  - .1 Submit copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless so directed by Departmental Representative.
  - .2 Make changes as required and resubmit two (2) copies as directed by Departmental Representative.
- .7 Additional data:
  - .1 Prepare and insert into operation and maintenance manual when need for same becomes apparent during demonstrations and instructions specified above.

1.12 SHOP DRAWINGS  
AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 33 00 Submittal Procedures.
- .2 Shop drawings and product data shall show:
  - .1 Mounting arrangements.
  - .2 Operating and maintenance clearances. eg. access door swing spaces.
  - .3 Installation requirements and procedures.
- .3 Shop drawings and product data shall be accompanied by:
  - .1 Detailed drawings of bases, supports, and anchor bolts.
  - .2 Acoustical sound power data, where applicable.
  - .3 Points of operation on performance curves.
  - .4 Manufacturer to certify as to current model production.
  - .5 Certification of compliance to applicable codes.

- 1.12 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)
- .4 In addition to transmittal letter referred to in Section 01 33 00 Submittal Procedures. Identify section and paragraph number.
  - .5 Refer to Section 23 05 00 - HVAC - General for coordination shop drawing requirements.
- 1.13 CLEANING
- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.
- 1.14 PROJECT RECORD DRAWINGS
- .1 Site records:
    - .1 Departmental Representative will provide one (1) set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of the work. Mark there on all changes as work progresses and as changes occur. This shall include changes to existing mechanical systems, control systems and low voltage control wiring.
    - .2 On a weekly basis, transfer information to reproducibles, revising reproducibles to show all work as actually installed.
    - .3 Use different colour waterproof ink for each service.
    - .4 Make available for reference purposes and inspection at all times.
  - .2 Project Record drawings:
    - .1 Prior to start of Testing, Adjusting and Balancing (TAB), finalize production of as-built drawings.
    - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: "Project Record drawings: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).
    - .3 Submit to Departmental Representative for approval and make corrections as directed.
    - .4 TAB to be performed using Project Record drawings.
    - .5 Submit completed reproducible Project Record drawings with Operating and Maintenance Manuals.
  - .3 Submit copies of Project Record drawings for inclusion in final TAB report.
-

- |   |    |  |
|---|----|--|
| <u>1.15 WASTE<br/>MANAGEMENT AND<br/>DISPOSAL</u> | .1 | Separate and recycle waste materials in accordance with Section 01 74 21.  |
| <u>1.16 ELECTRICAL</u>                            | .1 | Electrical work to conform to Division 26 including the following:<br>.1 Starters, motor protection and manual control devices are specified and indicated in Division 26 except where otherwise indicated or specified. Wiring to packaged mechanical equipment is indicated on electrical drawings. Coordinate as required.<br>.2 Supplier and installer responsibility is indicated on electrical drawings and related mechanical responsibility as indicated on mechanical equipment schedules on mechanical drawings or in specifications.<br>.3 Control wiring 50 V and greater, specified and installed by Division 26. Control wiring 50 V or less, is responsibility of EMCS contractor, except as indicated elsewhere in the specifications. |
| <u>1.17 EQUIPMENT<br/>SUPPORTS</u>                | .1 | Equipment supports supplied by equipment manufacturer specified elsewhere in Divisions 21, 22 and 23.  |
|   | .2 | Equipment supports not supplied by equipment manufacturer: fabricate from structural grade steel meeting requirements of Section 05 50 00 - Metal Fabrication. Submit structural calculations with shop drawings.  |
|   | .3 | Mount base mounted equipment on chamfered edge housekeeping pads, minimum of 150mm high and 100mm larger than equipment dimensions all around. Concrete specified in Section 03 30 00 - Cast-in- Place Concrete by Division 03 Contractor.   |
| <u>PART 2 - PRODUCTS</u>                          |    | Not applicable.  |
| <u>PART 3 - EXECUTION</u>                         |    | Not applicable.  |

PART 1 - GENERAL

- |                               |   |
|-------------------------------|---|
| <u>1.1 GENERAL CONDITIONS</u> | <ul style="list-style-type: none"><li>.1 All drawings and all division and sections of these specifications apply to and form an integral part of this division.</li><li>.2 Refer to Division 1 for description of work areas, sequencing of work, restrictions, etc.</li></ul>   |
| <u>1.2 SCOPE</u>              | <ul style="list-style-type: none"><li>.1 This specification outlines requirements for new:<ul style="list-style-type: none"><li>.1 Sprinkler systems.</li><li>.2 Fire pump.</li><li>.3 Standpipe system.</li><li>.4 Fire extinguishers.</li></ul></li></ul>   |
| <u>1.3 RELATED WORK</u>       | <ul style="list-style-type: none"><li>.1 Division 1.</li><li>.2 Division 23.</li><li>.3 Division 26.</li><li>.4 Division 28.</li><li>.5 Review the drawings and specifications of other trades for work relating to this trade.</li></ul>   |
| <u>1.4 CONTRACT DRAWINGS</u>  | <ul style="list-style-type: none"><li>.1 Refer to mechanical index sheet for list of drawings.</li></ul>  |
| <u>1.5 REGULATIONS</u>        | <ul style="list-style-type: none"><li>.1 The installation of the fire suppression systems shall be in accordance with the drawings issued under this contract, these specifications, and;<ul style="list-style-type: none"><li>.1 Nova Scotia Building Code Regulations 2011.</li><li>.2 Nova Scotia Fire Safety Regulations 2011.</li><li>.3 NFPA 10-2010, Standard for Portable Fire Extinguishers.</li><li>.4 NFPA 13-2010, Standard for the Installation of Sprinkler Systems.</li><li>.5 NFPA 14-2010, Standard for the Installation of Standpipe Systems.</li><li>.6 NFPA 20-2010, Standard for the Installation of Stationary Pumps for Fire Protection.</li></ul></li></ul> |
-

- 
- 1.5 REGULATIONS .1 (Cont'd)  
(Cont'd) .7 NFPA 25-2011, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.
- 1.6 COMPONENTS .1 All system components required to be "listed" as per NFPA shall have their listing through Underwriter's Laboratories of Canada (ULC).
- 1.7 AUTHORITY .1 The system is to be reviewed by the "Nova Scotia  
HAVING Office of the Fire Marshal (NSOFM)".  
JURISDICTION
- 1.8 REVIEW .1 The working (shop) drawings are to be reviewed by  
AUTHORITY the Departmental Representative. Direct any comments to the Departmental Representative for review and action.  
.2 The Departmental Representative will forward the drawings to the NSOFM.
- 1.9 SUBMISSIONS .1 Shop drawings:  
.1 Submitted in strict accordance with NFPA 13.  
.2 Floor plan drawings to match the tender drawings scale and show required pipe routing, valves, sprinklers, fire pump, and all other system components.  
.3 Plot plan showing underground services, and siamese connection.  
.4 Cross sections of building showing floors, ceilings and sprinkler system components.  
.5 Submit updated drawings at regularly scheduled job meetings or as requested by the Departmental Representative during construction.  
.6 Working (shop) 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 ten (10) working days for the Departmental Representative's review of each submission.  
.7 Confirmation for full time foreman's name and provincial certification.  
.8 Submit drawings as described above and in AutoCAD 2006 (or newer) format complete with electronic copy of each drawing.
-



1.9 SUBMISSIONS  
(Cont'd)

- .1 Shop drawings:(Cont'd)
  - .9 Submit hydraulic calculations for review.
  - .10 Complete catalogue information for devices/equipment specified.
  - .11 The working drawings shall be submitted as one package.
  - .12 Six (6) copies of each to be submitted.
- .2 Contractor record drawings:
  - .1 Record drawings to represent the installed system components.
  - .2 Use reviewed (stamped) white print shop drawings. During system installation note any substantial variances from the reviewed drawings and shall record these variances in red pencil on these drawings.
  - .3 Identify drawings as "Project Record Copy". Maintain in new condition and make available for inspection on site and at job meetings.
  - .4 Submit up-to-date accurate record drawings for the complete systems to the Departmental Representative.
  - .5 Provide folded white prints for each maintenance manual and AutoCAD files on CD.
- .3 Operation and Maintenance Data.
  - .1 Provide three copies 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 the NSBC and NFPA 25.
    - .3 Copy of record drawings (folded prints) and electronic file on CD.
    - .4 Copy of hydraulic calculations complete with node drawings.
    - .5 Calculations and drawings are to show volumes of dry pipe systems.
    - .6 Copy of material and test certificate for sprinkler and standpipe systems backflow preventer. It is the responsibility of the Trade Contractor to forward test certificates to NSOFM.
    - .7 Letter identifying Trade Contractor's maintenance and warranty obligations.
    - .8 Copy of Material and Test Certificate for the new water entrance.
    - .9 Fire pump test results and start up letter from supplier.
    - .10 Pressure settings for all switches, pumps, and compressors.
    - .11 Copy of hydraulic data nameplates.

- 
- 1.9 SUBMISSIONS (Cont'd)
- .3 (Cont'd)
- .1 (Cont'd)
- .12 Letter from fire department accepting threads/connection on fire department connection and hose valve connections.
- .2 Binders are to include an index and dividing tabs for each section.
- .4 Submit maintenance manuals two (2) weeks prior to Substantial Completion.
- 1.10 TRADE CONTRACTOR
- .1 Only workers competent in the installation of sprinkler systems, standpipe systems, and fire pumps, and who have a thorough and demonstrated knowledge of requirements in NFPA 10, NFPA 13, NFPA 14, NFPA 20, and NFPA 25 will be considered acceptable for this contract.
- .2 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. Trade Contractors are required to ensure that their workers are certified in accordance with the Apprenticeship and Occupational Certification Act, Section 17(2).
- 1.11 SPARE PARTS
- .1 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.
- 1.12 MAINTENANCE
- .1 Include in their price, one year full maintenance as per the NFC, NFPA 10, and NFPA 25.
- .2 Provide quarterly inspections throughout the first year. Issue proper forms, as per NFPA 25, to the Departmental Representative after each inspection.
- .3 Servicing, including replacement parts for the complete system, shall be readily available locally within 24 hours of the placing of a trouble call.
- .4 Test the fire pump as per NFPA 25 at the 12 month anniversary, prior to expiration of warranty.
-

- 
- 1.13 WARRANTY .1 The equipment and installation shall be under full labour and material warranty for a period of one year from certification.
- 1.14 CERTIFICATION .1 Complete Material and Test Certificates for each system (zone) in accordance with NFPA 13.
- .2 Complete Material and Test Certificates for the new water entrance prior to starting the new pump in accordance with NFPA 13. Coordinate with the Contractor installing the underground.
- .3 ThComplete Material and Test Certificates for the standpipe system in accordance with NFPA 14.
- .4 Test the new fire pump in accordance with NFPA 20 in the presence of the pump manufacturer representative. Once this test is complete and the fire pump is operating correctly an additional test shall be completed and witnessed by the Departmental Representative and Authority Having Jurisdiction. Coordinate testing with other trades, local Authorities and Departmental Representative.
- .1 The installing trade contractor will not be considered as the pump manufacturer representative.
- .5 Post certification date on certificate unless otherwise directed by the Departmental Representative.
- 1.15 DESIGN APPROACH .1 The Departmental Representative has designed the sprinkler systems for the purpose of tendering.
- .2 Prepare detailed design/working drawings following a detailed site and tender package review and coordination.
- .3 Prepare hydraulic calculations matching the installation (shop) drawings.
- .4 Install the system using the reviewed shop drawings and is responsible for confirming all pipe routing and sprinkler head locations. Any changes will be the responsibility of the Contractor and must be approved by the Departmental Representative.
- .5 Any changes to piping or sprinkler head locations or type that, in the opinion of the Departmental Representative, significantly alter the hydraulic
-

1.15 DESIGN APPROACH (Cont'd)	.5	(Cont'd) design, will require confirming hydraulic calculations.
	.6	Refer to drawings for hazard tables.
	.7	The following criteria shall be met: .1 Wet pipe sprinkler systems for all occupied areas of the building. Each system (zone) is to be equipped with a flow switch, control valve, and test and drain assembly complete with pressure relief. The wet pipe systems will be supplied by a riser check valve. .2 A dry pipe sprinkler system is to be provided in the bin collar. .3 Wet system light hazard areas (e.g. office, classrooms, open lounges) are to be designed to a density of 4.1 mm/min over a maximum of 139 m2 plus a 378 L/min hose demand. .4 Wet system Ordinary Hazard, Group 1 areas (e.g. mechanical and electrical rooms) are to be designed to a density of 6.1 mm/min over a maximum of 139 m2 plus a 946 L/min hose demand. .5 Dry system Ordinary Hazard, Group 1 areas are to be designed to a density of 6.1 L/min/m2 over a minimum of 181 m2 plus a 946 L/min hose demand. .6 The maximum sprinkler spacing for sprinklers installed in regular ceilings is 20 m2 for light hazard areas and 12 m2 for ordinary hazard areas. The maximum spacing for sprinklers installed above the open grid ceiling is 3 m x 3.6 m for light hazard areas and 3 m x 3 m for ordinary hazard areas. .7 The standpipe system is to be designed to provide 1,892 L/min at a pressure of 690 kPa at the top most hose connection.
1.16 SYSTEM DESCRIPTION	.1	This contract includes work identified on the contract drawings and specifications.
	.2	Include the following for each wet pipe sprinkler system 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	Include the following with the riser check valve: .1 Riser check valve. .2 Control valve complete with tamper switch. .3 Low water pressure switch. .4 Listed pressure gauges.

1.16 SYSTEM DESCRIPTION (Cont'd)	.3 (Cont'd)
	.5 System header piping.
	.6 Main drain valve and all drain piping.
	.4 Include the following for the dry pipe sprinkler system:
	.1 Dry valve complete with trim.
	.2 Control valve 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 Low point drain complete with drum drip connection at each system low point.
	.5 Fasten identification tags to control valves and clearly indicate the appropriate system.
	.6 Hydraulic data nameplate for each system.
	.7 The systems must be designed not to exceed 1,200 kPa working pressure.
1.17 DESIGN CRITERIA	.1 Water supply for the sprinkler system will be based on the municipal supply and fire pump boost.
	.2 Flow test results: refer to drawing.
	.3 Calculations are to include a 10% safety factor on the combined water supply and fire pump.
	.4 No safety factors are required for the standpipe system hydraulic calculations.

PART 2 - PRODUCTS

- 2.1 SPRINKLERS
- .1 All sprinklers shall be manufactured by one manufacturer.
  - .2 Sprinklers:
    - .1 Tyco Series TY-FRB quick response upright sprinklers
      - .1 Temperature 68°C, and 93°C
      - .2 15 mm orifice, k = 80.6 (5.6)
      - .3 Brass finish
    - .2 Tyco Series TY-FRB quick response semi-recessed pendent sprinklers
      - .1 Temperature 68°C, 93°C
      - .2 15 mm orifice, k =80.6 (5.6)
      - .3 Chrome finish
      - .4 Tyco Style 10 escutcheons
    - .3 Tyco Series TY-FRB quick response horizontal sidewall sprinklers
      - .1 Temperature 68°C
      - .2 15 mm orifice, k = 80.6 (5.6)
      - .3 Brass finish
    - .4 Tyco Series RFII quick response concealed pendent sprinklers
      - .1 Coordinate plate column with architect.
      - .2 Temperature 68°C
      - .3 k = 80.6 (5.6)
    - .5 Tyco Series DS-1 quick response dry pendant and sidewall sprinklers
      - .1 Standard coverage
      - .2 Temperature 68°C
      - .3 k = 80.6 (5.6)
      - .4 Chrome finish
    - .6 Tyco Series TY-FRB quick response dry horizontal sidewall sprinklers
      - .1 Extended coverage
      - .2 Temperature 68°C
      - .3 k = 80.6 (5.6)
      - .4 Chrome finish
  - .3 Alternates meeting the above noted criteria are acceptable: Reliable, Victaulic, and Viking.
- 2.2 PIPING AND FITTINGS
- .1 Piping must satisfy the following criteria:
    - .1 Steel pipe shall be of the type tested for sprinkler use as per Section 6.3 of NFPA 13 and be stamped accordingly. Pipe to be manufactured in Canada or the United States. All pipe must be stored inside prior to installation and have zero corrosion.

2.2 PIPING AND  
FITTINGS  
(Cont'd)

- .1 (Cont'd)
- .2 Concealed pipe shall have red and white decals indicating sprinkler system piping every 3 m along mains and risers. Brady type or equivalent.
- .3 Schedule 40 black steel for pipe 50 mm or smaller.
- .4 Schedule 10 black steel for pipe 65 mm and greater.
- .5 Schedule 40 galvanized piping for dry pipe systems and pipe penetrating exterior walls. Galvanized pipe shall be dipped at the factory.
- .6 Ductile iron piping from water entrance connection to backflow preventer.
- .7 Acceptable Products: Bull Moose, Allied, Wheatland, and Youngstown.
- .8 One (1) manufacturer to be used for all pipe.
- .2 Fittings must satisfy the following criteria:
  - .1 Piping 65 mm and greater to be grooved wet pipe systems.
  - .2 Piping 50 mm and smaller to be threaded or grooved wet pipe systems.
  - .3 Fittings are to withstand 1,200 kPa working pressure.
  - .4 Fittings to be of the type tested for sprinkler use as per Section 6.4 of
  - .5 NFPA 13. Each individual fitting is to be complete with a ULC marking, be stored inside prior to insulation, and have zero corrosion.
  - .6 All couplings and fittings on dry system and to the exterior to be galvanized.
  - .7 Gaskets on dry system shall be listed for dry systems.
  - .8 Flexible couplings on standpipe risers where they penetrate stair landings and masonry walls as required for seismic protection.
  - .9 Acceptable Products (Grooved): Victaulic, Shurjoint, and Tyco.
  - .10 Acceptable Products (Screwed): Ward, BMI, and Anvil Star.
  - .11 One (1) manufacturer to be used for each type (grooved and screwed) of fitting.
- .3 All dry system piping to be cut grooved.
- .4 Flange bolts to be square or hexhead bolts with heavy hex nuts to ASTM A307.
- .5 Flange gaskets to be 1.6 mm thick plain or cloth inserted red rubber to ASME/ANSI B16.20 and ASME/ANSI B16.21.
- .6 Tie rods shall be a minimum of 16 mm.

2.2 PIPING AND FITTINGS (Cont'd)	.7	No site welding.
	.8	Exposed hangers shall have collars/plates at ceilings.
2.3 CONTROL VALVES	.1	Use only one manufacturer's valves.
	.2	Valves to be ULC listed.
	.3	Valves shall bear: <ul style="list-style-type: none"><li>.1 Manufacturer's name.</li><li>.2 Trademark.</li><li>.3 Valves controlling water supply to any part of the fire suppression systems shall be:<ul style="list-style-type: none"><li>.1 65 mm and greater: Victaulic Butterfly Model 705 complete with tamper switch.</li><li>.2 50 mm and under: Victaulic Model 728 complete with tamper switch.</li><li>.3 Victaulic Series 771 OS&amp;Y gate valve on suction side of fire pump.</li><li>.4 Victaulic Model 707 butterfly valve (supervised closed) for fire pump test header, flow meter, and standpipe test header.</li></ul></li></ul>
	.4	Acceptable Alternates: Milwaukee, Grinnell-Gruvlok, Jenkins, Nibco, Mueller, Watts, Kennedy, Fivalco, and Global Safety Products. Provided they meet the technical criteria specified.
2.4 SPRINKLER FLOW SWITCH	.1	Potter VSR-F vane type water flow switch with retard and cover tamper switch kit.
	.2	Acceptable Alternate: System Sensor.
2.5 SPRINKLER TAMPER SWITCH	.1	Switches for Butterfly and Butterball valve. Refer to Section 2.3.
	.2	Potter OSYSU for OS&Y gate valves.
	.3	Acceptable Alternates: System Sensor and Victaulic.
2.6 CHECK VALVE	.1	Reliable Model D swing check valve complete with 12 mm ball drip.
	.2	Acceptable Alternates: Viking, Tyco, Victaulic, Nibco, and Kennedy.



2.7 PIPE HANGERS  
AND BRACES

- .1 Support piping by hangers as per NFPA 13.

2.8 INSPECTOR'S  
TEST CONNECTION/  
DRAINS

- .1 AGF TestanDrain (pre- manufactured) at zone control valves, model 1011A.
- .2 Testor Drain assemblies to be complete with pressure relief.
- .3 Control valves, sight glass, reducing orifice, and galvanized pipe to exterior for remote test connections.
- .4 Acceptable Alternate: Victaulic.

2.9 PRESSURE  
GAUGES

- .1 Provide and install a listed 100 mm pressure gauge at valve headers, on all test connection assemblies, and at the top of each standpipe riser.
- .2 Provide and install 100 mm liquid filled pressure gauges on fire pump suction and discharge flanges.
- .3 Acceptable Products: Lyn-Car, Winters, Tyco, Viking, Victaulic, and Reliable.

2.10 SPRINKLER HEAD  
GUARDS/ESCUTCHEONS

- .1 To be listed for use with installed sprinkler heads.
- .2 Acceptable Product: Tyco.

2.11 SPRINKLER HEAD  
CABINETS

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

2.12 IDENTIFICATION  
TAGS

- .1 Required for all control valves, drain valves, inspector's test connections, trim valves, and auxiliary drain valves.
- .2 Identification tags shall be red lamicoid with white letters.
- .3 Additional tagging is required on ceilings when a valve is located above.

2.13 HYDRAULIC  
DATA NAMEPLATES

- .1 Hydraulic nameplate signs.
- .2 Acceptable Products: Lyn-Car, Tyco, Reliable, and Viking.

2.14 JOCKEY PUMP

- .1 Aurora Model PVMI2-90 pump.
- .2 575 volt, 3 phase, 3 hp.
- .3 Acceptable Alternate: Albany and Goulds.

2.15 JOCKEY PUMP  
CONTROLLER

- .1 Tornatech Model JP3
- .2 575 volt, 3 phase, 60 hz.
- .3 Acceptable Alternates: Cutler Hammer and Westinghouse.

2.16 FIRE  
DEPARTMENT PUMPER  
CONNECTION

- .1 National Fire Equipment Model 229, flush mounted, 100 mm x 65 mm, 65 mm, double clapper inlet complete with Storz connections chrome caps and chain.
- .2 Exterior plate and cover shall have chrome finish and read "Sprinkler/Standpipe".
- .3 Acceptable Alternates: Canadian Fire Hose and Wilson & Cousins.

2.17 RISER CHECK  
VALVE

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

2.18 LOW WATER  
PRESSURE SWITCH

- .1 Potter PS-120A.
- .2 Acceptable Alternate: System Sensor.

2.19 AIR COMPRESSOR

- .1 Trade Contractor to determine volume of system and provide a new air compressor complete with tank for the dry pipe system. Located in the pump room adjacent to dry valve.

- 
- |  |    |  |
|--|----|--|
| <u>2.19 AIR COMPRESSOR</u><br>(Cont'd) | .2 | Trade Contractor to provide all materials for compressor operations, including any starter-on switch. Electrical connection will be by others. |
|  | .3 | Air compressor shall be capable of restoring normal air pressure in system within 30 minutes.  |
|  | .4 | Compressor to be 208 volt, 3 phase.  |
| <br>                                   |    |  |
| <u>2.20 AIR MAINTENANCE DEVICE</u>     | .1 | Viking Model D-2 complete with by- pass trim.  |
|  | .2 | Acceptable Alternates: Tyco, Reliable, and Victaulic.  |
| <br>                                   |    |  |
| <u>2.21 ALARM SWITCH</u>               | .1 | Potter PS-10A.   |
|  | .2 | Acceptable Alternate: System Sensor.   |
| <br>                                   |    |  |
| <u>2.22 QUICK OPENING DEVICE</u>       | .1 | Viking Model D-2, complete with anti-flooding device.  |
|  | .2 | Acceptable Alternates: Reliable, Victaulic, and Tyco.  |
| <br>                                   |    |  |
| <u>2.23 LOW AIR PRESSURE SWITCH</u>    | .1 | Potter PS-40A.   |
|  | .2 | Acceptable Alternate: System Sensor.   |
| <br>                                   |    |  |
| <u>2.24 DRY PIPE VALVE</u>             | .1 | Viking Model F-1 complete with trim.   |
|  | .2 | Acceptable Alternates: Reliable, Tyco, and Victaulic.  |
| <br>                                   |    |  |
| <u>2.25 HOSE VALVES</u>                | .1 | National Fire Equipment 65 mm Model A56 hose valve complete with cap and chain.  |
|  | .2 | Chrome finish.   |
|  | .3 | Acceptable Alternates: Lyn-Car, Canadian Fire Hose, Wilson & Cousins, and Giacomini.   |
-

- 
- |   |    |   |
|---|----|---|
| 2.26 <u>DOUBLE CHECK<br/>VALVE BACKFLOW<br/>PREVENTER</u> | .1 | Watts Silver Eagle Series 757 complete with test cocks, OS&Y gate valves, and tamper switch at water entrance.                              |
|   | .2 | Acceptable Alternate: Ames & Wilkins (complete with OS&Y gate valves).  |
|   |    |   |
| 2.27 <u>PORTABLE FIRE<br/>EXTINGUISHERS</u>               | .1 | Stored pressure dry chemical, 10 lbs, ABC type.   |
|   | .2 | Carbon dioxide, 10 lbs, BC type for electrical rooms.   |
|   | .3 | Acceptable Manufacturers: Badger, National Fire Equipment, Lyn Car, Pyrene, Wilson and Cousins, Canadian Fire Hose and Flag.                |
|   |    |   |
| 2.28 <u>FIRE<br/>EXTINGUISHER<br/>CABINET</u>             | .1 | National Fire Equipment Model CE- 950-3 SCFR, semi-recessed type for ABC, 10 lbs dry chemical extinguishers, fire rated.                    |
|   | .2 | National Fire Equipment Model ECS- 10510 4BS surface cabinet, white finish, suitable for 10lbs ABC extinguishing located in parking garage. |
|   |    |   |
| 2.29 <u>STANDPIPE<br/>TEST HEADER</u>                     | .1 | National Fire Equipment Model A53 complete with 65 mm hose valves, caps, chains, and wall plate.  |
|   | .2 | Exterior plate caps, and valves shall have a chrome finish and read "Standpipe Test Header".  |
|   | .3 | Acceptable Alternates: Wilson & Cousins and Canadian Fire Hose.   |
|   |    |   |
| 2.30 <u>FLOW METER</u>                                    | .1 | Gerrard Engineering Model K-500-6 with 1898 kPa pressure rating.  |
|   | .2 | Acceptable Alternates: Victaulic Series 735, Model S.   |
-

PART 3 - EXECUTION

3.1 APPROVALS

- .1 Working (shop) drawings and hydraulic calculations shall be reviewed by the Departmental Representative and NSOFM prior to any fabrication, ordering of material, or site work.
- .2 The fire pump will be reviewed on site by the Departmental Representative prior to start of installation.

3.2 SITE VISIT  
REPORTS

- .1 Do not recess, paint or conceal piping, accessories, or work prior to observation of construction by the Departmental Representative.
- .2 Site visit reports as issued by the Departmental Representative are to be signed off (by item) by the Site Foreman when the deficiency is rectified. Reports are to be issued to the Departmental Representative upon completion.

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 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.
- .7 Install guards on all sprinkler heads where possible damage could occur.
- .8 Locate spare sprinkler head cabinet at the pump room and hydraulic data nameplates at the respective valve header.

3.3 INSTALLATION  
(Cont'd)

- .9 Intermediate temperature classification sprinklers to be installed in service and elevator machine rooms and skylights.
- .10 All pipes draining to exterior shall be located a maximum of 610 mm above grade and discharge on a 610 mm x 610 mm concrete patio stone. Provide six (6) patio stones on roof for testing standpipe. Locate patio stones on site with Departmental Representative.
- .11 Install sprinkler protection below obstructions in all service rooms as per the requirements of NFPA 13. Allow for installation of 50 additional sprinklers for entire building.
- .12 Install the following:
  - .1 A jockey pump complete with controller, sensing line, piping, valves, and fittings.
  - .2 Fire department connection, complete with valves, fittings, and wall plate.
  - .3 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".
  - .4 Dry 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".
  - .5 Liquid filled pressure gauge on the fire pump. Air filled gauges can be used at the valve headers and test locations.
- .13 Install high temperature classification sprinkler heads where located within a 2.1m radius of unit heater.
- .14 The pressure sensing line for the fire and jockey pump is to be installed per NFPA 20, not be interconnected, and be run overhead.
- .15 All sprinklers are to be centered on ceiling tiles unless shown otherwise on drawings.
- .16 All dry type sprinkler heads to be installed in tee connections.
- .17 Install a pressure gauge at the top of each standpipe riser.
- .18 Install standpipe system progressively with construction as per the NSBCR. This includes water supply and fire department pumper connection.

- 
- 3.3 INSTALLATION  
(Cont'd)
- .19 Sprinklers located above open- grate ceilings shall be spaced at a maximum of 3 m x 3.6 m in light hazard areas and a maximum of 3 m x 3 m in ordinary hazard areas. A clear 610 mm is required between the deflector and the open-grate ceiling. The spacing shall be limited to 3 m x 3 m if the clearance requirement of 610 mm cannot be met.
- 3.4 FIRE STOPPING
- .1 Fire stopping will be by others. All penetrations through all separations (with and without fire-resistance rating) shall be fire stopped as per the NSBC.
- .2 This Trade Contractor is to assist Contractor in identifying areas for fire stopping associated with this Trade's penetrations.
- 3.5 TESTING AND TRAINING
- .1 This Trade Contractor shall subject all system components to operational and hydrostatic tests as per NFPA 13, 14, 20, and 25. Repair any leaks or defective piping that should occur during the tests.
- .2 This Trade Contractor shall provide hydraulic pump, temporary connections and labour required to perform tests.
- .3 The building maintenance staff shall be trained prior to functional testing. Allow for three, two hour sessions.
- .4 Conduct a full system functional test (sprinkler standpipe and fire pump systems) in the presence of the Departmental Representative. Provide foreman for a minimum of 8 hours for the duration of this testing. The purpose of the test will be to verify the operation of the equipment and provide additional training to the building maintenance staff. Ten (10) days notice shall be given before any functional testing. Coordinate testing with fire alarm Contractor.
- .5 each sprinkler system zone, backflow preventer, and new water entrance.
- .6 Test the fire pump in accordance with NFPA 20. Coordinate testing with local Authorities, Fire Alarm Contractor, Electrical Contractor and Departmental Representative. Fire pump to be tested by pump manufacturer prior to test noted above.
-

3.6 CUTTING, CORE  
DRILLING, PATCHING  
AND PAINTING

- .1 All cutting, core drilling, patching, and painting shall be the responsibility of the Trade Contractor. Coordinate with other Trades and Contractor.
- .2 Prime and paint all exposed sprinkler piping and fittings in finished areas (anti-corrosion paint) with four coats in total on site. Colour to match ceiling finish. Confirm colour with Departmental Representative.
- .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 structural, architectural, plumbing, ventilation, heating, and electrical systems to avoid interference.
- .2 Sprinkler head locations are to be coordinated with all other services and ceilings. The architectural reflected ceiling plans are to be used for this purpose.
- .3 The complete tender package including architectural, kitchen, structural, mechanical (plumbing and ventilation), and electrical along with a detailed site review, shall be used in producing shop drawings.