1. GENERAL

1.1 Scope

.1 Potable water supply piping and equipment.

.2 Fire Extinguishers

.3 Related supports, hangers, seals and signage.

1.2 Intent

.1 Provide complete, fully tested and operational plumbing systems to meet the requirements described herein and in complete accordance with current edition of all applicable codes and ordinances.

.2 Contract Documents and Drawings of this Division are diagrammatic and approximately to scale unless detailed otherwise. They establish scope, material and installation quality and are not detailed installation instructions.

.3 Follow Manufacturers' recommended installation details and procedures for equipment, supplemented by requirements of Contract Documents.

.4 Install equipment generally in locations and routes shown. Run piping parallel to building lines so as to minimize interference with other services and free space. Remove and replace improperly installed piping, ductwork, and equipment to satisfaction of the Contract Administrator at no extra cost.

.5 Install equipment to provide access and ease of maintenance.

.6 Connect to equipment specified in other Sections and to equipment supplied and installed by other Subcontractors. Uncrate equipment, move in place and install complete; start-up and test.

.7 Install control valves, control dampers, thermal wells, and other devices on piping and ducts, furnished by controls Subcontractor.

.8 'Provide' shall mean 'supply and install'.

1.3 Action and Informational Submittals

.1 Submittals: in accordance with Section E3 - Submittals and Shop Drawings.

.2 Shop drawings: in accordance with Section E3 – Submittals and Shop Drawings; submit Contractor reviewed drawings stamped, dated and signed by the Contractor to indicate acceptance, and stamped by a professional engineer registered or licensed in Manitoba, Canada where indicated in these specifications.

.3 Shop drawings to show:

.1 Mounting arrangements.

.2 Operating and maintenance clearances.

.4 Shop drawings and product data 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 current model production.

.5 Certification of compliance to applicable codes.

.5 Closeout Submittals:

.1 Provide operation and maintenance data for incorporation into manual specified Section E51 – Closeout Submittals.

.2 Operation and maintenance manual approved by, and final copies deposited with, Contract Administrator before final inspection.

.3 Operation data to include:

.1 Control schematics for systems including environmental controls.

.2 Description of systems and their controls.

.3 Description of operation of systems at various loads together with reset schedules and seasonal variances.

.4 Operation instruction for systems and 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 to include:

.1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.

.2 Data to include schedules of tasks, frequency, tools required and task time.

.5 Performance data to include:

.1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.

.2 Equipment performance verification test results.

.3 Special performance data as specified.

.6 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.7 Site records:

.1 Contract Ad ministrator will provide 1 set o f r eproducible plumbing drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as cha nges occ ur. Include changes t o existing plumbing systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.8 As-built drawings:

.1 Prior to start of commissioning; finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: T HIS DRAWING HAS BEEN REVI SED T O SHOW PLUMBING SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Contract Administrator for approval and make corrections as directed.

.4 Perform testing and commissioning using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.9 Submit copies of as-built drawings for inclusion in final TAB report.

1.4 Coordination of Work

.1 Cooperate and coordinate with other Contractors and Subcontractors on the project.

.2 Make reference to Civil, Electrical, HVAC, Process, Controls, Structural, and Architectural drawings when setting out work. Consult with respective Divisions in setting out locations for ductwork, equipment, and piping, so that conflicts are avoided and symmetrical even spacing is m aintained. Jointly work out all conflicts on W ork Site before f abricating or installing any materials or equipment.

.3 Coordinate installation with Division 26 Subcontractor.

.4 Where dimensional details are required, work with the applicable architectural and structural drawings.

.5 Full-size and detailed drawings shall take precedence over scale measurements from Drawings. Drawings shall take precedence over Specifications.

.6 Any areas indicated as space for future materials or equipment shall be left clear.

1.5 Coordination with Utilities

.1 Apply for, and pay all fees related to the provision of potable water service to the structure.

.2 Coordinate the timing, location and capacity of the services to be provided by the Utility and supervise all installation work.

1.6 Permits

.1 Obtain all permits and pay all fees applicable to the Work.

.2 Contractor shall arrange for inspections of the Work by the authorities having jurisdiction and shall provide certificates indicating Final Approval.

1.7 Quality Assurance

.1 Quality Assurance: in accordance with referenced standards and codes.

.2 All work shall be performed by qualified tradesmen with valid Provincial Trade Qualification Certificates. Spot checks will be made by the Contract Administrator.

1.8 Metric Conversion

.1 All units in this division are expressed in SI units.

.2 Equivalent Nominal Diameters of Pipes - Metric and Imperial:

.1 Where pipes are specified with metric dimensions and Imperial sized pipes are available, provide equivalent nominal Imperial sized pipe as indicated in the table, and provide at no extra cost adapters to ensure compatible connections to all metric sized fittings, equipment and piping.

.2 When CSA approved SI Metric pipes are provided, the Contractor shall provide at no extra cost adapters to ensure compatible connections between the SI Metric pipes and all new and existing pipes, fittings, and equipment.

mm (in. NPS)	mm (in. NPS)	mm (in. NPS)
3 (1/8)	65 (2½)	450 (18)
6 (1/4)	75 (3)	500 (20)
10 (3/8)	100 (4)	600 (24)
15 (1/2)	125 (5)	750 (30)
20 (3/4)	150 (6)	
25 (1)	200 (8)	
30 (1¼)	250 (10)	

mm (in. NPS)	mm (in. NPS)	mm (in. NPS)
40 (1½)	300 (12)	
50 (2)	375 (15)	

1.9 Drawings and Specifications

.1 Drawings and specifications are complementary each to the other, and what is called for by one shall be binding as if called for by both.

.2 Should any discrepancy appear between drawings and/or specifications which leaves the Contractor in any doubt as to the true intent and meaning of the plans and specifications, obtain a ruling from the Engineer, before submitting a tender. If this is not done, it will be assumed that the most expensive alternate had been included.

.3 Examine all contract documents, including all drawings and specifications, and work of other Subcontractors to ensure that work is satisfactorily carried out without changes to building.

1.10 Shop Drawings

.1 Submit Shop Drawings as per Section E3 – Submittals and Shop Drawings.

.2 Clearly mark each Shop Drawing with the Specification Section number together with the clause number or schedule number and the item tag number (where applicable) to which it refers. Failure to include this information on shop drawings will result in the drawings being rejected.

.3 Identify materials and equipment by manufacturer, trade name and model number. Include copies of applicable brochure or catalogue material. Do not assume applicable catalogues are available in the Engineer's office. Maintenance and operating manuals are not suitable submittal material.

.4 Clearly mark submittal material using arrows, underlining or circling to show differences from specified, e.g. ratings, capacities and options being proposed. Cross out non-applicable material. Specifically note on the submittal specified features such as special coatings, construction materials or electrical rating.

.5 Include weights, dimensional, and technical data sufficient to check if equipment meets requirements. Include wiring, piping, and service connection data and motor sizes. Provide centre of gravity diagrams. Prior to submission to the Contract Administrator, the Contractor shall review all shop drawings. By this review, the Contractor certifies that he has determined and verified all field measurements, field construction criteria, materials, catalogue numbers and similar data, and certifies that he has checked and coordinated each shop drawing with the requirements of the work of the Contract Documents. Additionally the Contractor certifies by this review the compliance of the submittal package with the requirements of items 1 through 5 above. The Contractor's review of each Shop Drawing shall be indicated by stamp, date and signature of the Contractor's designated project manager.

.6 Installed materials and equipment shall meet specified requirements regardless of whether or not shop drawings are reviewed by the Contract Administrator.

.7 Retain one (1) copy of Shop Drawings on Work Site for review.

1.11 Excavation and Backfill

.1 Refer to requirements of the City of Winnipeg Construction Master Specification Division 2.

.2 Provide all excavating to facilitate installation of the plumbing work, including shoring, pumping, 150 mm compacted sand bedding under and first 300 mm of compacted sand over piping and ducting.

1.12 Installation of Equipment

.1 Install all equipment in accordance with the manufacturer's installation instructions.

.2 Unions and flanges shall be provided in piping to permit easy removal of equipment.

.3 Maintain permanent access to equipment for maintenance.

1.13 Electrical Motors

.1 Supply plumbing equipment complete with electrical motors.

.2 Provide motors designed, manufactured, and tested in accordance with the latest edition of the following codes and standards: NEMA, EEMAC, CSA, CEC Part 1, IEEE and ANSI. All motors to be CSA labeled. All motors to be approved for use in the designated area classification by the Provincial Electrical Protection Branch.

.3 All motors intended for use with a variable speed drive (VFD) shall be inverter duty rated. Variable speed drive shall be matched to motor. Coordinate with Electrical.

.4 Two speed motors shall have separate winding for each speed.

.5 Unless specified otherwise, provide motors designed for full voltage starting, EEMAC Design B. Motors driving high torque or high inertia loads may be EEMAC Design C or D.

.6 Provide motors rated for continuous duty with 1.15 service factor unless specified otherwise in the driven equipment specifications. Provide all motors with thermal overload protection.

.7 Motors less than 0.37 kW shall be 120 V, 60 Hz, 1 phase. Motors 0.37 kW and larger shall be 3 phase at the indicated voltage.

.8 All motors shall be 1800 rpm except where indicated.

.9 Provide motors with grease or oil lubricated anti-friction type ball or roller bearings.

.10 Provide motors designed with Class B insulation; Class F insulation for totally enclosed motors.

.11 Refer to electrical specifications Division 26, for voltage, frequency, and phase data. This shall take precedence over any reference in Division 22.

.12 Where motor power is stated in watts or kilowatts, nominal motor horsepower multiplied by 746 or 0.746 respectively, has been used as the conversion factor.

1.14 Miscellaneous Metals

.1 Provide all necessary miscellaneous metals to hang or support pipe materials, equipment and provide access for work under this contract.

.2 All miscellaneous metals shall be corrosion resistant primer coated.

.3 Miscellaneous metals shall include but are not limited to:

.1 Hangers for equipment, piping and fixtures.

.2 Support for equipment.

.3 Access platforms and catwalks.

1.15 Painting and Identification

.1 Coordinate colour coding of piping and equipment with work of Division 09.

.2 Colour code plumbing equipment, piping and exposed ductwork. Refer to colour coding schedule below.

.3 Legend and direction of flow arrows shall consist of adhesive backed labels, yellow colour, with minimum 20 mm high black lettering equal to Brady System B-500, vinyl cloth labels for non-insulated surfaces; and Brady B 946 for insulated surfaces.

.4 Identify piping with labels, colour bands, and flow arrows. Provide identification at 3 m maximum intervals, before and after pipes pass through walls, at all sides of tees, behind access doors and in equipment rooms as required.

.5 Apply colour bands at both ends of the label with primary colour bands used to secure both ends of individual labels. Refer to colour schedule at end of this section.

.6 Provide 3 mm thick, 20 mm diameter white lamacoid with black engraved numbers, secured to valve stem with key chain. Provide neat, typewritten directories, giving valve number, services and location. Frame one copy under glass for wall mounting in Generator Room as directed, second copy to be forwarded to City. Include copies in O&M Manuals.

.7 Provide 3 mm thick, 20 mm diameter white lamacoid with black engraved lettering secured to equipment. Use a maximum of 25 letters/numbers per line. For terminal cabinets, control panels, etc. use size # 5. For equipment in Mechanical Rooms use size # 9. For equipment elsewhere size as appropriate. Conform to following table.

Size #	Sizes (mm)	No. of Lines	Height of Letters (mm)
1	10 x 50	1	3
2	13 x 75	1	5
3	13 x 75	2	3
4	20 x 100	1	8
5	20 x 100	2	5

6	20 x 200	1	8
7	25 x 125	1	12
8	25 x 125	2	8
9	35 x 200	1	20

.8 Tag automatic controls, instruments and relays and match/key to control shop drawing identification numbers. Tag all equipment and control panels.

.9 Identify electric starting switches, thermostats controlling motors, remote push button stations, and controls equipment supplied under this division with lamacoid plates having 5 mm minimum letter size. Identification to state equipment controlled

1.16 Plumbing Control Systems

.1 Conduit pull boxes, terminal boxes and junction boxes - GREY Covers - GREY with black 'C'.

.2 Main and secondary control panels, factory finish acceptable - control Subcontractor to install company label to identify.

1.17 Temporary or Trial Usage

.1 Temporary or trial usage by the Engineer or Contract Administrator of plumbing equipment supplied under contract shall not represent acceptance.

.2 Repair or replace permanent equipment used temporarily.

.3 Repair or otherwise rectify damage caused by defective materials or workmanship during temporary or trial usage.

1.18 Acceptable Manufacturers/Suppliers and Agencies

.1 The following listed manufacturers are acceptable for their ability to meet the general design intent, quality and performance characteristics of the specified product. The list does not endorse the acceptability of all products available from the listed Manufacturers/Suppliers.

.2 It remains the responsibility of the Contractor to ensure the products supplied are equal to the specified products in every respect, operate as intended, and meet the performance specifications and physical dimensions of the specified product.

.3 The Contractor shall be fully responsible for any additional work or materials, to accommodate the use of equipment from the acceptable Manufacturers and Suppliers list.

.4 Submit within fourteen (14) days of contract award a copy of the list underlining the name of the manufacturer whose price was carried in the tender. If no manufacturers names are submitted, it will be assumed that the price carried in the tender was that of the specified manufacturer or where the specified product is generic, the first acceptable manufacturer listed for each item and equipment.

.5 List of Acceptable Manufacturers/Suppliers and Agencies:

.1	Access Doors	Maxam, Acudor, Milcor, Can.Aqua, Mifab, The Williams Brothers Corporation
.2	Backflow Preventers	Watts, Febco, Zurn
.3	Hanger and Supports	Anvil International, E. Myatt & Co. Inc., Empire Tool & Mfg. Co. Inc., Unistrut, Tolco, Erico Canada, Taylor
.4	Hose	Goodall Rubber, Goodyear
.5	Hose Reels	Reelcraft, Cox, Hannay
.6	Insulation - Piping	Fibreglass Canada, Manson, Knauf Fibreglass, Plasti-Fab, Manville
.7	Vibration Isolation	Mason, Vibro Acoustic

1.19 Maintenance

.1 Furnish spare parts in accordance with Section E51 – Closeout Submittals:

.1 One repair kit for backflow preventer.

1.20 Delivery, Storage, and Handling

.1 Materials delivered to site must be properly protected to prevent damage from handling, storage and the effects of the weather.

.2 Provide adequate storage on site for materials received which are not yet required for installation. Storage shall be secure, weather-resistant, and available for inspection by the Contract Administrator.

2. PRODUCTS (NOT USED)

3. EXECUTION

3.1 Pipe Installation

.1 Install pipe parallel to walls and grid lines.

.2 Arrange piping to permit complete drainage and effective venting of air.

.3 Conform to the requirements of the National Plumbing Code of Canada 2010 as amended by the Manitoba Plumbing Code Regulation 31/2011.

3.2 Cleaning

.1 Refer to requirements for flushing and disinfection within Section 22 11 16 – Domestic Water Piping.

3.3 Field Quality Control

.1 Site Tests: conduct following tests on site before Substantial Performance.

.1 Cold water piping pressure test in accordance with Section 22 11 16 – Domestic Water Piping.

3.4 Demonstration

.1 Engineer will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 Trial usage to apply to following equipment and systems:

.1 Cold Water Supply system.

.3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.5 Instruction duration time requirements as specified in appropriate sections.

.6 Contract Administrator will record these demonstrations on video tape for future reference.

3.5 Protection

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

.2 Protect equipment and system components from physical damage, corrosion, and theft/vandalism.

END OF SECTION

DOMESTIC WATER PIPING

1. GENERAL

1.1 References

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)

.1 ANSI/ASME B16.15-06, Cast Copper Alloy Threaded Fittings: Classes 125 and 250.

.2 ANSI/ASME B16.18-01, Cast Copper Alloy Solder Joint Pressure Fittings.

.3 ANSI/ASME B16.22-01, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

.4 ANSI/ASME B16.24-06, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Classes 150, 300, 600, 900, 1500 and 2500.

.2 ASTM International (ASTM)

.1 ASTM B88M-03, Standard Specification for Seamless Copper Water Tube (Metric).

.3 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).

.1 MSS SP-80-03, Bronze Gate, Globe, Angle and Check Valves.

.4 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 53302, National Plumbing Code of Canada (NPC) 2010

.5 Government of Manitoba

.1 Manitoba Plumbing Code Regulation 32/2011.

1.2 Action and Informational Submittals

.1 Provide submittals in accordance with Section E3 – Submittals and Shop Drawings.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 Quality Assurance

.1 Quality Assurance: in accordance with referenced standards and codes.

2. PRODUCTS

2.1 Piping

.1 Domestic cold water systems, within building.

.1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.

.2 Buried or embedded: copper tube, soft annealed, type K: to ASTM B88M, in long lengths and with no buried joints.

2.2 Fittings

.1 Cast bronze threaded fittings, Class 125: to ANSI/ASME B16.15.

.2 Cast copper, solder type: to ANSI/ASME B16.18.

.3 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

.4 NPS 2 and smaller: wrought copper to ANSI/ASME B16.22 or cast copper to ANSI/ASME B16.18; Suitable for operating pressure to 1380 kPa.

2.3 Joints

.1 Solder: 95/5 tin-antimony alloy.

.2 PTFE tape: for threaded joints.

.3 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 Ball Valves

.1 NPS 2/DN 50 and under, screwed:

.1 Class 150.

.2 Bronze or Forged Brass body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle as specified Section 23 05 23.01 - Valves - Bronze

.2 NPS 2/DN 50 and under, soldered:

.1 To ANSI/ASME B16.18, Class 150.

.2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with socket solder ends as specified Section 23 05 23.01 - Valves - Bronze.

3. EXECUTION

3.1 Installation

.1 Install in accordance with NPC as amended by the Manitoba Plumbing Code Regulation and local authority having jurisdiction.

.2 Assemble piping using fittings manufactured to ANSI/ASME standards.

.3 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.4 Buried tubing:

.1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.

.2 Bend tubing without crimping or constriction. Minimize use of fittings.

3.2 Valves

.1 Isolate equipment, fixtures and branches with ball valves.

3.3 Pressure Tests

.1 Test pressure: greater of 1.5 times maximum system operating pressure or 860 kPa.

3.4 Flushing and Cleaning

.1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean with copper levels within the Canadian Drinking Water Standards. Let system flush for additional 2 hours, then draw off another sample for testing.

3.5 Pre-Start-Up Inspections

.1 Systems to be complete, prior to flushing, testing and start-up.

.2 Verify that system can be completely drained.

.3 Ensure that pressure booster systems are operating properly.

3.6 Disinfection

.1 Flush out, disinfect and rinse system to the requirements of the City of Winnipeg Standard Construction Specifications CW 2110.

.2 Upon completion, provide laboratory test reports on water quality for Contract Administrator approval.

3.7 Start-Up

.1 Timing: start up after:

.1 Pressure tests have been completed.

.2 Disinfection procedures have been completed.

.3 Certificate of Substantial Completion has been issued.

.2 Provide continuous supervision during start-up.

.3 Start-up procedures:

.1 Establish flow and ensure that air is eliminated.

.2 Check pressurization to ensure proper operation and to prevent water hammer.

END OF SECTION

1. GENERAL

1.1 Summary

.1 Section Includes:

.1 Materials and installation for plumbing specialties and accessories, including:

.1 Backflow Preventers.

.2 Vacuum Breakers.

.3 Hose Bibbs and Sediment Faucets

.4 Water Meters.

.5 Hose Reel

.6 Hose

.7 Fire Extinguishers.

1.2 References

.1 ASTM International (ASTM).

.1 ASTM-B62-09, Standard Specification for Composition Bronze or Ounce Metal Castings.

.2 American Water Works Association (AWWA).

.1 AWWA C700-09, Cold Water Meters-Displacement Type, Bronze Main Case.

.3 Canadian Standards Association (CSA).

.1 CSA B64 Series-07, Backflow Preventers and Vacuum Breakers.

.4 National Fire Protection Association (NFPA)

.1 NFPA 10-2007, Standard for Portable Fire Extinguishers.

1.3 Action and Informational Submittals

.1 Submittals in accordance with Section 22 05 00 – Common Work Results for Plumbing.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.

.2 Indicate dimensions, construction details and materials for specified items.

.3 Submit WHMIS MSDS in accordance with Workplace Safety and Health requirements.

.3 Shop Drawings:

.1 Submit shop drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions, construction and assembly details and accessories.

.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Instructions: submit manufacturer's installation instructions.

.6 Manufacturers' Field Reports: manufacturers' field reports specified.

2. PRODUCTS

2.1 Back Flow Preventers

.1 Preventers: to CSA B64 Series, reduced pressure principle type with inlet strainer and quarter turn isolation valves.

2.2 Vacuum Breakers

.1 Breakers: to CSA-B64 Series, vacuum breaker for hose connection at hose bibb.

2.3 Hose Bibbs and Sediment Faucets

.1 Bronze construction complete with integral vacuum breaker, hose thread spout, replaceable composition disc, and male thread inlet.

2.4 Water Meters

.1 Displacement type to AWWA C700.

.2 Capacity: flow rate 6.3 L/s at maximum pressure drop 69 kPa flanged pipe connections. 40 mm (NPS 1-1/2).

.3 Accessories: remote readout device.

.4 Acceptable Material: Neptune T-10 or approved equal in accordance with B8.

2.5 Hose Reel HR-1

.1 Stainless steel hose reel with hand crank, wall mounting bracket, 20 mm inlet and reel connections, 23 m hose capacity, maximum pressure of 207 bar at up to 99°C.

.2 Acceptable Material: Reelcraft model HS29000M

2.6 Hose

.1 Low pressure water washdown hose, EPDM tube with high tensile wire braid reinforcement and Gray EPDM jacket. 20mm Ø x 15m length. Hose thread male inlet and built-in factory

nozzle on outlet end. Abrasion resistant and non-marking cover. Max. 2. 0 MPa water operating between -40°C and 185°C.

.2 Acceptable Material: Goodall model N2613 Gray Washdown with built-on nozzle.

2.7 Fire Extinguishers

.1 Stored Pressure multipurpose dry chemical fire extinguishers rated for 2A10BC. Non-conductive hose and nozzle, built-in pressure gauge, and vehicle bracket mounting hardware. Rating and design in accordance with NFPA 10.

3. EXECUTION

3.1 Installation

.1 Install in accordance with National Plumbing Code of Canada 2010 as amended by the Manitoba Plumbing Code Regulation 32/2011, and the local authority having jurisdiction.

.2 Install in accordance with manufacturer's instructions and as specified.

3.2 Back Flow Preventors

.1 Install in accordance with CSA B64 Series, where indicated and elsewhere as required by code.

.2 Pipe discharge from vent chamber to discharge chamber with air gap and p-trap using PVC-DWV pipe.

3.3 Hose Bibbs and Sediment Faucets

.1 Install at bottom of risers, at low points to drain systems, and as indicated. Hose bibs to have vacuum breaker.

3.4 Water Meters

.1 Install water meter provided by local water authority.

3.5 Hose Reel

.1 Install on wall in Wetwell where shown.

3.6 Hose

.1 Install hose on hose reel and coil neatly to prevent kinking or crushing of the hose.

3.7 Fire Extinguishers

.1 Install in locations shown on the drawings with the pressure gauge at 1500mm above the adjacent floor service.

.2 Install signage over the fire extinguisher to make the location visible from anywhere in the room.

.3 Include first yearly inspection and maintenance on fire extinguishers

3.8 Start-Up

.1 Timing: start-up only after:

.1 Pressure tests have been completed.

.2 Disinfection procedures have been completed.

.3 Certificate of substantial completion has been issued.

.2 Provide continuous supervision during start-up.

3.9 Testing and Adjusting

.1 Timing:

.1 After start-up deficiencies rectified.

.2 After certificate of inspection has been issued by authority having jurisdiction.

.2 Application tolerances:

.1 Pressure at fixtures: +/- 70kPa.

.2 Flow rate at fixtures: +/- 20%.

.3 Adjustments:

.1 Verify that flow rate and pressure meet design criteria.

.4 Vacuum breakers and backflow preventers:

.1 Test tightness, accessibility for O&M of cover and of valve.

.2 Simulate reverse flow and back-pressure conditions to test operat ion of v acuum breakers, backflow preventers.

.3 Verify visibility of discharge from open ports.

.5 Hose Reels, Hose bibbs, sediment faucets:

.1 Test flow rate and operability of valve operators.

.6 Commissioning Reports:

.1 Submit report to the Contract Administrator outlining the tests conducted and the results recorded as per Section E3 – Submittals and Shop Drawings.

END OF SECTION