
PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 09 91 23 - Painting.
- .2 Section 23 05 05 - Installation of Pipework.
- .3 Section 23 05 29 - Hangers and Supports for HVAC Piping And Equipment.
- .4 Section 23 05 53.01 - Mechanical Identification.
- .5 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .6 Section 23 07 15 - Thermal Insulation for Piping.

1.2 REFERENCES

- .1 National Research Council of Canada (NRCC)/Institute for Research in Construction.
 - .1 NRCC 53301, National Building Code of Canada 2015 (NBCC).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .3 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.
- .4 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- .5 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.

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- .3 Operation data to include:
 - .1 Control schematics for systems.
 - .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.
 - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
 - .6 Approvals:
 - .1 Submit Operation and Maintenance Manual to Departmental Representative for approval in accordance with Section 01 78 00 - Closeout Submittals. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
 - .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
 - .8 Site records:
 - .1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical 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.
 - .9 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, 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: 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 Perform testing, adjusting and balancing using as-built drawings.
- .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .10 Submit copies of as-built drawings for inclusion in final TAB report.

1.4 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

1.5 MAINTENANCE

- .1 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 All materials and products to be new unless otherwise noted.

PART 3 EXECUTION

3.1 GENERAL

- .1 Perform Work in accordance with National Building Code including all amendments up to tender closing date. More stringent Code requirements of provincial or local application, and requirements of Authorities Having Jurisdiction provided that, in case of conflict or discrepancy, the more stringent requirements apply.

3.2 PAINTING REPAIRS AND RESTORATION

- .1 Do painting in accordance with Section 09 91 23 - Painting.
- .2 Prime and touch up marred finished paintwork.
- .3 Restore to new condition, finishes which have been damaged.

3.3 IDENTIFICATION

- .1 In accordance with Section 23 05 53.01 - Mechanical Identification.

3.4 TESTING, ADJUSTING AND BALANCING

- .1 In accordance with Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

3.5 CLEANING

- .1 Clean interior and exterior of all systems including strainers.

3.6 NEW OPENINGS IN EXISTING STRUCTURE

- .1 Review location of new openings with Departmental Representative prior to coring.
- .2 Do not core through existing beams, including ribs in concrete structure.
- .3 Perform X-ray examination of structure when other means of examination cannot provide confirmation that structure members will not be damaged.

3.7 PROTECTION

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

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 22 05 00 - Common Work Results for Plumbing.
- .2 Section 23 05 00 - Common Work Results for HVAC.
- .3 Section 23 05 05 - Installation of Pipework.
- .4 Section 23 05 23.01 - Valves - Bronze.
- .5 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .6 Section 23 07 15 - Thermal Insulation for Piping.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM) International Inc.
 - .1 ASTM B88M-13, Standard Specification for Seamless Copper Water Tube (Metric).
- .2 American Society of Mechanical Engineers International (ASME)
 - .1 ASME B16.15-2013, Cast Copper Alloy Threaded Fittings, Classes 125 and 250.
 - .2 ASME B16.18-2012, Cast Copper Alloy Solder Joint Pressure Fittings.
 - .3 ASME B16.22-2013, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - .4 ASME B16.24-2011, Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 600, 900, 1500 and 2500.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS)
 - .1 MSS-SP-80-2013, Bronze Gate, Globe, Angle and Check Valves.
- .6 National Research Council (NRC)/Institute for Research in Construction
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC), 2015.
- .7 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .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.
- .3 Closeout Submittals:
 - .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS

2.1 PIPING

- .1 Domestic hot, cold and recirculation systems, within building.
 - .1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.

2.2 FITTINGS

- .1 Bronze pipe flanges and flanged fittings, Class 150 and 300: to ASME B16.24.
- .2 Cast bronze threaded fittings, Class 125 and 250: to ASME B16.15.
- .3 Wrought copper and copper alloy, solder type: to ASME B16.22.

2.3 JOINTS

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

2.4 VALVES

- .1 Refer to valve specifications in Section 23 05 23.01 - Valves - Bronze.
- .2 Provide isolating valves in accessible locations for hot and cold water lines to all fixtures and groups of fixtures.
- .3 Provide pressure reducing valves where required to limit pressure at each fixture to 550 kPa.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Install in accordance with National Plumbing Code and local Authority Having Jurisdiction.
- .2 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
- .3 Assemble piping using fittings manufactured to ANSI standards, with unions to allow for removal of equipment.
- .4 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

3.2 VALVES

- .1 Isolate equipment, fixtures and branches with ball valves.
- .2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

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 Disinfect potable water systems as required by the municipality and the Province. Provide disinfectants and flushing agents as required.
- .2 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean to Provincial potable water guidelines.

3.5 PRE-START-UP INSPECTIONS

- .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that all parts of the system can be completely drained.
- .3 Ensure that air chambers, expansion compensators and shock absorbers are installed properly.

3.6 START-UP

- .1 Timing: Start up after:
 - .1 Pressure tests have been completed.
 - .2 Certificate of static completion has been issued.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
 - .1 Establish circulation and ensure that air is eliminated.
 - .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
 - .3 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify any start-up deficiencies.

3.7 PERFORMANCE VERIFICATION

- .1 Scheduling:
 - .1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by Authority Having Jurisdiction.
- .2 Procedures:
 - .1 Verify that flow rate and pressure meet Design Criteria.
 - .2 Verify performance of temperature controls.
 - .3 Verify compliance with safety and health requirements.
 - .4 Check for proper operation of water hammer arrestors. Operate one fixture in each group of fixtures or equipment outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers.
 - .5 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning.
- .3 Reports:
 - .1 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

PART 1 GENERAL1.1 RELATED REQUIREMENTS

- .1 Section 22 05 00 - Common Work Results for Plumbing.
- .2 Section 23 05 05 - Installation of Pipework.

1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM) International Inc.
 - .1 ASTM B32-08(2014), Standard Specification for Solder Metal.
 - .2 ASTM B306-13, Standard Specification for Copper Drainage Tube (DWV).
 - .3 ASTM C564-14, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B67-1972 (R1996), Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.
 - .2 CAN/CSA-B70-12, Cast Iron Soil Pipe, Fittings and Means of Joining, Includes Update No. 1 (2012).
 - .3 CAN/CSA-B125.3-12, Plumbing Fittings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: in accordance with Section 01 74 21 - Construction/Demolition Waste Management.
- .4 Store at temperatures and conditions recommended by manufacturer.

PART 2 PRODUCTS2.1 MATERIAL

- .1 Sustainable Requirements: complete work in sustainable manner.

2.2 COPPER TUBE AND FITTINGS

- .1 Above ground sanitary and vent Type DWV to: ASTM B306.
 - .1 Fittings.
 - .1 Cast brass: to CAN/CSA-B125.3.
 - .2 Wrought copper: to CAN/CSA-B125.3.
 - .2 Solder: lead free, 95:5, Type TA, ASTM B32.

2.3 CAST IRON PIPING AND FITTINGS

- .1 Above ground sanitary: to CAN/CSA-B70.
 - .1 Joints:
 - .1 Hub and spigot:
 - .1 Caulking lead: to CSA B67.
 - .2 Mechanical joints:
 - .1 Neoprene or butyl rubber compression gaskets with stainless steel clamps.

PART 3 EXECUTION3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 In accordance with Section 22 05 00 - Common Work Results for Plumbing.
- .2 Install in accordance with National Plumbing Code and local Authority Having Jurisdiction.

3.3 TESTING

- .1 Hydraulically test to verify grades and freedom from obstructions.

3.4 PERFORMANCE VERIFICATION

- .1 Cleanouts:
 - .1 Ensure accessible and that access doors are correctly located.
 - .2 Open, cover with linseed oil and re-seal.
 - .3 Verify that cleanout rods can probe as far as the next cleanout, at least.
- .2 Test trap seal primers.
- .3 Ensure that fixtures are properly anchored, connected to system and effectively vented.

PART 1 GENERAL1.1 RELATED REQUIREMENTS

- .1 Section 07 92 00 - Joint Sealants.
- .2 Section 23 05 05 - Installation of Pipework.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM) International Inc.
 - .1 ASTM F1412-16, Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems.
 - .2 ASTM F1673-10, Standard Specification for Polyvinylidene Fluoride (PVDF) Corrosive Waste Drainage Systems.
 - .3 ASTM D2564-12, Standard Specification for Solvent Cements for Poly (Vinyl-Chloride) (PVC) Plastic Piping Systems.
 - .4 ASTM D2657-07(2015), Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.
 - .5 ASTM E84-15b/UL 723-2008, Standard Test Method for Surface Burning Characteristics of Building Materials.
- .2 Canadian Standards Association (CSA) International
 - .1 CSA-B181.2-15, PVC Drain, Waste and Vent Pipe and Pipe Fittings.
- .3 Health Canada/workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS)
- .4 Underwriter's Laboratories of Canada (ULC).
 - .1 CAN/ULC S102.2-10, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.
 - .2 CAN/ULC-S115-11, Standard Method of Fire Tests of Firestop Systems.
- .5 Warnock Hersey International (WHI).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for piping and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide two copies WHMIS MSDS - Material Safety Data Sheets.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Store at temperatures and conditions recommended by manufacturer.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

PART 2 PRODUCTS2.1 MATERIAL

- .1 Adhesives and Sealants: in accordance with Section 07 92 00 - Joint Sealants.

2.2 PIPING AND FITTINGS

- .1 For buried and above ground concealed DWV piping to:
 - .1 PVC pipe to CAN/CSA-B181.2.
 - .2 Not acceptable for exposed above ground applications.
 - .3 Pipe and fittings must be supplied by the same manufacturer.
 - .4 Pipe and fittings must be listed to CAN/ULC S102.2 and clearly marked with the certification logo indicating a flame-spread rating not exceeding 25.
 - .5 Joints: solvent weld for PVC: to ASTM D2564.

2.3 FIRESTOPPING DEVICES

- .1 Certified to CAN/ULC-S115 and tested with a 50 Pa pressure differential.

PART 3 EXECUTION3.1 GENERAL

- .1 Minimum pipe grade:
 - .1 For sizes smaller than 100 mm, minimum grade to be 2%.
 - .2 Sizes 100mm and larger, minimum grade to be 1%.

3.2 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.3 INSTALLATION

- .1 In accordance with Section 23 05 05 - Installation of Pipework.
- .2 Install in accordance with National Plumbing Code and local Authority Having Jurisdiction.
- .3 Install in accordance with manufacturer's requirements.

3.4 FIRESTOPPING

- .1 Provide certified firestopping devices at all penetrations of fire separations.
- .2 Install in accordance with the appropriate WHI listings supplied by the firestopping device manufacturer.

3.5 TESTING

- .1 Hydraulically test to verify grades and freedom from obstructions.

3.6 PERFORMANCE VERIFICATION

- .1 Cleanouts:
 - .1 Ensure accessible and that access doors are correctly located.
 - .2 Open, cover with linseed oil and re-seal.
 - .3 Verify cleanout rods can probe as far as the next cleanout, at least.
- .2 Test to ensure traps are fully and permanently primed.
- .3 Ensure fixtures are properly anchored, connected to system and effectively vented.
- .4 Affix applicable label (storm, sanitary, vent, pump discharge) c/w directional arrows every floor or 4.5 m (whichever is less).

3.7 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 22 05 00 - Common Work Results for Plumbing.

1.2 REFERENCES

- .1 American National Standard Institute (ANSI)
 - .1 ANSI/ASSE Standard 1017-2009, Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems.
 - .2 ANSI Z21.22-2015/CSA 4.4-2015, Relief Valves for Hot Water Supply Systems.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-B64 Series-11, Backflow Preventers and Vacuum Breakers (Consists of B64.0, B64.1.1, B64.1.2, B64.1.3, B64.1.4, B64.2, B64.2.1, B64.2.1.1, B64.2.2, B64.3, B64.3.1, B64.4, B64.4.1, B64.5, B64.5.1, B64.6, B64.6.1, B64.7, B64.8 and B64.9).
 - .2 CSA-B79-08 (R2013), Commercial and Residential Drains and Cleanouts.
 - .3 CSA B125.3-12, Plumbing Fittings.
 - .4 CSA-B356-10 (R2015), Water Pressure Reducing Valves for Domestic Water Supply Systems, Includes Update No. 2 (2015).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Plumbing and Drainage Institute (PDI)
 - .1 PDI-G101-2010, Testing and Rating Procedure for Hydro Mechanical Grease Interceptors with Appendix of Installation and Maintenance.
 - .2 PDI-WH201-2010, Water Hammer Arresters Standard

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 PRODUCTS

2.1 CLEANOUTS

- .1 Provide cleanouts in locations indicated (c.o.) and where required by Codes.
- .2 Cleanouts to be concealed wherever possible, in ceiling spaces, below counters, etc.

- .3 Clean out plugs to be heavy cast iron ferrule with brass screws and threaded brass or bronze plug, with neoprene gasket.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 INSTALLATION

- .1 Install in accordance with National Plumbing Code of Canada and local Authority Having Jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

3.3 CLEANOUTS

- .1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required code, and as indicated.
- .2 Bring cleanouts to wall or finished floor unless serviceable from below floor.
- .3 Building drain cleanout and stack base cleanouts: line size to maximum NAPS.

3.4 START-UP

- .1 Timing: start-up only after:
 - .1 Pressure tests have been completed.
 - .2 Disinfection procedures have been completed.
 - .3 Certificate of static completion has been issued.
 - .4 Water treatment systems operational.
- .2 Provide continuous supervision during start-up.

3.5 TESTING AND ADJUSTING

- .1 Timing:
 - .1 After start-up deficiencies rectified.
 - .2 After certificate of completion has been issued by Authority Having Jurisdiction.
- .2 Application tolerances:
 - .1 Pressure at fixtures: +/- 70 kPa.

- .2 Flow rate at fixtures: +/- 20%.
- .3 Adjustments:
 - .1 Verify that flow rate and pressure meet design criteria.
 - .2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.
- .4 Access doors:
 - .1 Verify size and location relative to items to be accessed.
- .5 Cleanouts:
 - .1 Verify covers are gas-tight, secure, yet readily removable.

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 22 13 18 - Drainage Waste and Vent Piping - Plastic.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-B45 Series-02 (R2013), Plumbing Fixtures (Consists of B45.0, B45.1, B45.2, B45.3, B45.4, B45.5, B45.6, B45.7, B45.8 and B45.9).
 - .2 CAN/CSA-B125.3-12, Plumbing Fittings.
 - .3 CAN/CSA-B651-12, Accessible Design for the Built Environment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Include:
 - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
 - .2 Details of operation, servicing, maintenance.
 - .3 List of recommended spare parts.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

PART 2 PRODUCTS2.1 MANUFACTURED UNITS

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.3.
- .3 Exposed plumbing brass to be chrome plated.
- .4 Number, locations: architectural drawings to govern.
- .5 Fixtures to be product of one manufacturer.
- .6 Trim to be product of one manufacturer.
- .7 Fixtures: as scheduled.
- .8 Fixture piping:
 - .1 Hot and cold water supplies to each fixture:
 - .1 Chrome plated flexible supply pipes each with screwdriver stop, reducers, escutcheon.
 - .2 Waste:
 - .1 General:
 - .1 Brass P trap with clean out on each fixture not having integral trap.
 - .2 Chrome plated in all exposed places.
 - .2 Laboratory fixtures:
 - .1 Provide stainless steel tailpiece, open grid strainer, standpipe, drain plug for sinks integral with counter tops.
 - .2 Refer also to Section 22 13 18 - Drainage Waste and Vent Piping - Plastic.
- .9 Chair carriers:
 - .1 Factory manufactured floor-mounted carrier systems for all wall-mounted fixtures.

PART 3 EXECUTION3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Mounting heights:
 - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
 - .2 Wall-hung fixtures: to comply with manufacturer's recommendations, measured from finished floor.
 - .3 Physically handicapped: to comply with most stringent of either NBCC, OBC or CAN/CSA-B651.

3.3 ADJUSTING

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .3 Checks:
 - .1 Aerators: operation, cleanliness.
 - .2 Vacuum breakers, backflow preventers: operation under all conditions.
- .4 Thermostatic controls:
 - .1 Verify temperature settings, operation of control, limit and safety controls.

3.4 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

