

This specification outlines the requirements for the supply and installation of a sanitary sewer outfall pipe.

PART 1 REFERENCES

This specification refers to the following standards, specifications, or publications:

American Water Works Association (AWWA)

C104/A21.4	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
C150/A21.50	Thickness Design of Ductile-Iron Pipe
C151/A21.51	Ductile-Iron Pipe, Centrifugally Cast
C600	Installation of Ductile-Iron Mains and Their Appurtenances
C900	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4in Through 12in. (100mm Through 300mm), for Water Transmission and Distribution
C905	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14in Through 48in (350mm Through 1,200mm), for Water Transmission and Distribution

CSA Group

B137	Thermoplastic Pressure Piping Compendium
Z275.2	Occupational Safety Code for Diving Operations
Z275.4	Competency Standard for Diving, Hyperbaric Chamber, and Remotely Operated Vehicle Operations

PART 2 GENERAL

2.1 RELATED WORK SPECIFIED ELSEWHERE

- .1 Excavation, Trenching and Backfill: Section 02223
- .2 Maintenance Holes, Catch basins, Ditch Inlets and Ditch Inlets: Section 02601
- .3 Cast-In-Place Concrete: Section 03300
- .4 Aggregates, General: Section 02226

2.1 SUBMITTALS SAMPLES

- 2.2.1 Provide in accordance with Section 01340 – Shop Drawings, Samples and Submissions.

.4.2 At least 20 business days prior to commencing work, inform the Owner of proposed source of bedding materials and provide gradation analysis and other laboratory tests as directed by the Owner.

2.32.2 MATERIAL CERTIFICATION

.1 At least 20 business days prior to commencing work, submit manufacturer's test data and certification that pipe materials meet requirements of these specifications.

2.42.3 AS-BUILT DRAWINGS

.1 Provide data necessary to produce As-Built Drawings, including details of pipe material, invert elevations, and location of maintenance holes all in accordance with Section 01720 – Closeout Submittals.

2.52.4 SCHEDULING OF WORK

.1 Schedule Work to minimize interruptions to existing services.
.2 Maintain existing sewage flows during construction.
.3 Submit schedule of expected interruptions to the Owner for approval and adhere to approved schedule.
.3.4 **Notify the Owner 24 hours minimum in advance of any interruption in service.**

2.62.5 MANUFACTURER'S INSTRUCTIONS

.1 Make available one electronic copy of manufacturer's installation.

PART 3 PRODUCTS

3.1 PIPE AND FITTINGS

.1 Ductile Iron Pipe
.1 In accordance with ANSI/AWWA C150/A21.50 Pressure Class 350 for 2400 kPa for 100 to 300 mm diameter and as by design in accordance with ANSI/AWWA C150/A21.50 for 350 mm diameter and larger (as indicated in the MERX Schedule of Quantities & Prices Table). Cement mortar lined to ANSI/AWWA C104/A21.4.
.2 Joints
.1 Mechanical, rubber gaskets with plain tip, high strength heat treated cast-iron or alloy steel tie head bolts with hex nuts.
.2 Push-on joint with continuous rubber molded ring gasket.

- .3 All other pipes and fittings to be as specified under Section 02702 – Public Sanitary Sewerage Gravity Piping.
- .3 Polyvinyl Chlorine Pressure Pipe:
 - .1 In accordance with AWWA C900, AWWA C905, DR 18, pressure class 150 or to CSA B137; (unless otherwise specified in the MERX Schedule of Quantities and Prices), 1MPa gasket bell end, cast iron outside diameter.
- .4 Polyethylene Pressure Pipe:
 - .1 In accordance with CSA B137 (unless otherwise specified in the MERX Schedule of Quantities and Prices).
 - .2 HDPE to HDPE joints to be thermal butt fusion welded in accordance with CSA B137 or flanges with backing flanges when necessary.

3.2 PIPE BEDDING MATERIALS

- .1 Concrete required for cradles, encasement, supports, in accordance with Section 03300 – Cast-in-Place Concrete, strength 25 MPa.
- .2 Other bedding types including bedding for concrete to be as specified in accordance with Section 02223 – Excavating, Trenching and Backfilling.

PART 4 EXECUTION

4.1 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation. Inspect materials for defects before installation. Remove defective material from site.
- .2 Check profiles and confirm grades and depths with the Owner, prior to excavation.
- .3 Establish location and extent of known service lines and complete any Work with or around existing underground services as per Section 1005 – General Instructions.

4.2 TRENCHING AND BACKFILLING

- .1 Do trenching and backfilling in accordance with Section 02223 – Excavating, Trenching, and Backfilling.
- .2 Trench line and depth, as well as condition of trench bottom, require approval of the Owner prior to placing pipe.

.3 Do not backfill trenches until pipe grade and alignment have been checked and accepted.

4.3 CONCRETE BEDDING AND ENCASEMENT

.1 Do concrete work in accordance with Section 03300 – Cast-in-Place Concrete. Place concrete to details indicated or directed by the Owner.

.2 Pipe may be positioned on concrete blocks to facilitate placing of concrete. Rigidly anchor or weight pipe to prevent flotation when concrete is placed if necessary.

.3 Do not backfill over concrete within 24 hours after placing.

4.4 PIPE INSTALLATION

.1 Lay pipes in accordance with AWWA C600.

.2 Join pipes in accordance with AWWA C600 and the Manufacturer's Instructions. Torque wrench to be used for all mechanical joint bolts.

.3 Handle pipe by approved methods. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends. Inspect pipes for defects whole, suspended above grade. If required by the Owner, place heavy, tightly woven canvas bag over each pipe end before lowering into trench and leave in place until ready to make joint.

.4 Lay pipes on prepared bed, true to line and grade. Ensure barrel of each pipe is in contact with shaped bed throughout its full length. Take up and replace defective pipe. Correct pipe that is not in true alignment or grade or pipe that shows undue settlement after installation. Remove all rejected pipe from site of the Works.

.5 Face bell ends of pipe in direction of laying. For mains on a grade of 2 percent (%) or greater, face bell ends upgrade.

.6 Do not exceed permissible deflection at joints as recommended by pipe manufacturer.

.7 Keep jointing materials and installed pipe free of dirt, water and other foreign materials. Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials. Bulkhead to remain in place until all water is removed from trench.

.8 Position and join pipes with approved equipment. Do not use excavation equipment to force pipe sections together.

.9 Cut pipes as required for special fittings or closure pieces, in a neat manner as recommended by pipe manufacturer, without damaging pipe or

its coating and to leave a smooth end at right angles to axis of pipe. Flame cutting or burning of pipe not permitted.

- .10 Align pipes carefully before jointing.
- .11 Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
- .12 Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed or contaminated shall be removed, cleaned, lubricated and replaced before jointing is attempted again. Use only manufacturer's gasket lubricant.
- .13 Complete each joint before laying next length of pipe.
- .14 Minimize deflection after joint has been made.
- .14.15 At rigid structures, install pipe joints not more than 1.2 m from side of structure.
- .15.16 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.
- .16.17 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
- .17.18 Do not lay pipe on frozen bedding.

4.5 UNDERWATER VIDEO AND/OR PHOTO INSPECTION

- .1 Safety
 - .1 The underwater diving and preparation operations are to meet all the safety codes for diving practices both for the Federal and Provincial governing bodies, including "The Occupational Health & Safety Regulations, 2012, NL" and the Occupational Safety Code for Diving Operations CAN/CSA - Z275.4 and the Competency Standard for Diving, Hyperbaric Chamber, and Remotely Operated Vehicle Operations CAN/CSA - Z275.2.
 - .2 All divers and attendants are to be certified by the applicable regulatory body.
 - .3 Diving Contractors are responsible for ensuring that all divers, employees and equipment are certified and capable of performing the work described herein.
 - .4 Prior to any diving inspection, the diving Contractor shall provide a safe work operating procedure & execution plan that shall be suitable to the Owner and applicable safety regulations.
 - .5 The safe work & execution plan shall include, but not be limited to:

- .1 working around bodies of water;
- .2 boating safety and operator shall hold a valid license;
- .3 all worker(s) travel from shoreline to dive location;
- .4 diver and boat positioning/communication plan while underwater;
- .5 worker rescue & emergency response plan, including a plan to address the primary transport/rescue boat having mechanical issues during underwater operations;
- .6 notification to the closest hyperbaric chamber facility to make the facility aware of the dive in the event of an emergency;
- .7 dive tables;
- .8 harbour/river traffic management plan;
- .9 a dive schedule explaining the scope of the work;
- .10 confirmation/certificates that all divers and attendants are certified by the applicable regulatory body;
- .11 all equipment is calibrated, certified and capable of performing the work described herein;
- .12 a water sample confirming the presence and quantity of, if any, fecal chloroforms if deemed necessary.

.6 Contractor shall also have their Job Hazard Analysis (JHA) for the site and specific task(s). The JHA shall be suitable to the Owner, work crew, and conform to all applicable safety regulations prior to commencing work.

.2 Inspection

- .1 In general the diving Contractor shall provide the following:
 - .1 A colour video monitor and a clear two-way radio communication system that will enable the Owner to communicate with the divers during the inspection operation.
 - .2 A narrated colour video inspection of the above mentioned work. Marine growth shall be removed from the sample area and other areas where problems are suspected, prior to the video being taped at the Owner's discretion. The narration will clearly describe the location that the diver is inspecting. In particular, at locations where ice damage, scour, deterioration, corrosion, cracks, or any other distress exists in piling, pier caps, connections, concrete decking, or any other component of the structure, the location will be carefully and accurately recorded as the video is taken.
 - .3 Colour still photographs are required for all areas showing any signs of distress in the structure, such as ice damage, corrosion, cracks, pile uplift/deterioration, and scour or undermining of the foundations. Photographs shall be

numbered and corresponding to the number of the defect on the "Defect Map" in the subsection below.

- .4 A defect map showing all problem areas shall be provided showing the size, extent and location of the distress.
- .5 One electronic and one paper copy of a detailed report pertaining to the inspection will be submitted no later than two (2) weeks after completion of the work to the Owner. Included with the report will be one electronic and one USB drive copy of the narrated color video and photos of the inspection. This report will contain plans with detailed measurements, tables, color still photographs, a detailed discussion of the condition of the structure and its components, and any other information deemed necessary by the Owner to produce a clear and concise report which thoroughly describes the condition of the structure.

.3 Diving Report format to be as follows:

- .1 Cover sheet
- .2 Index
- .3 Preliminary data (location of inspection, climate and water conditions)
- .4 Abstract
- .5 Personnel
- .6 Method of inspection
- .7 Findings
- .8 Summary
- .9 Photographs with location plans
- .10 Drawings/Attachments

.4 The Contractor shall submit a draft report for review by the Owner. Once the draft report is accepted by the Owner with no further changes, the report can be finalized and submitted as a final report.

PART 5 PAYMENT

5.1 MEASUREMENT FOR PAYMENT

- .1 Outfall sewer will be measured horizontally from maintenance hole to discharge invert in metres. Horizontal measurements will be made over the surface, through fittings and maintenance holes after the work has been completed.
- .2 Tees, caps, plugs and other fittings will be measured by the number of units for each unit installed unless measurement is indicated to be included in the measurement of maintenance holes or other structures.

- .3 Concrete bedding and encasement of pipes will be measured in cubic metres to the measurement limits shown or specified, unless noted otherwise in the MERX Schedule of Quantities and Prices.
- .4 Concrete head blocks, cradles and supports will be measured by the number of units for each unit installed.
- .5 Underwater Video and/or Photo Inspection will be measured by lump sum.

5.2 BASIS OF PAYMENT

- .1 All costs associated with the work outlined in this specification shall be deemed to be included in the appropriate unit and lump sum prices quoted as outlined in the Measurement for Payment subsection of this section and as included in the MERX Schedule of Quantities and Prices.
- .2 Excavation and backfill will be measured in accordance with Section 02223 – Excavating, Trenching, and Backfilling.