

1.6 Submittals

- .1 At least 3 weeks prior to commencing work, inform Engineer of proposed source of aggregates.
- .2 The Contractor shall retain the service of an approved testing laboratory for aggregate sampling and testing.
- .3 At least 1 week prior to commencing work, submit to Engineer for his review the test results from the approved testing laboratory.

1.7 Measurement and Payment

- .1 Sanitary manhole chamber base shall be paid for at the lump sum bid which shall include all excavating, concrete work, reinforcing steel, backfilling and all other work required.

2.0 PRODUCTS

2.1 Materials

- .1 Cement: to CSA A5-M90, CAN A3001 Type HS.
- .2 Aggregates: to CSA 23.1.
- .3 Form Stripping Agent: colourless mineral oil, free of kerosene, with viscosity between 70 and 110 seconds Saybolt Universal 15 to 24 square millimetres per second at 40° C, flashpoint minimum 150° C, open cup.
- .4 Form Ties: removable or snap off metal ties, fixed or adjustable length, free of devices that will leave hole larger than 25 mm diameter and 10 mm deep in concrete surface.
- .5 Concrete reinforcement to Section 03200.

2.2 Concrete Mixes

- .1 Submit all proposed mix designs to Engineer a minimum of 5 days prior to placing concrete.
- .2 Except where indicated or specified otherwise, provide concrete mix for inlet and outlet structures as follows:

Minimum Compressive Strength - 28 days	32 MPa
Aggregate Size - Maximum	20 mm
Air Entrainment	7% ± 1%
Slump	75 mm ± 25 mm

- .3 Where 7 day strength is less than 70 per cent of specified 28 day strength, provide additional curing and make changes to mix proportions as required by Engineer.

3.0 EXECUTION

3.1 Workmanship

- .1 Ensure that reinforcement and inserts are securely fastened and will not be disturbed during concrete placement.
- .2 All concrete shall be watertight.
- .3 Provide dampproofing on all exterior walls, in contact with soil. Dampproofing shall be Bakelite Flintguard 710-11, with Bakelite Primer 910-11 or approved equal. Dampproofing shall be applied to manufacturer's instructions.
- .4 Place concrete in accordance with CSA-A23.1.

3.2 Inserts

- .1 Set sleeves, ties, anchor bolts and other inserts, openings and sleeves, specified in other sections.

3.3 Finishes

- .1 General and Schedule
 - .1 Remove fins and projections, repair damaged areas.
 - .2 The holes left by withdrawal of rods or the holes left by removal of ends of ties shall be filled solid with mortar after first being thoroughly wetted. For holes passing entirely through the wall, a plunger-type pressure gun or other device shall be used to force the mortar through the wall starting at the back face. A piece of burlap or canvas shall be held over the hole on the outside and when the hole is completely filled, the excess mortar shall be struck off with the cloth flush with the surface. Holes not passing entirely through the wall shall be filled with a small tool that will permit packing the hole solid with mortar. Any excess mortar at the wall shall be struck off flush with the surface.
 - .3 Provide Smooth-Form finish on all surfaces.
 - .4 Leave all voids filled without a visible grout film on the surface.
 - .5 Provide 25 mm chamfer on all exposed edges of concrete walls and floor slabs.

3.4 Control Joints

- .1 Saw cut control joints where shown on Drawings within 24 hours after finishing. Vacuum clean saw cut prior to installation of sealant.

3.5 Curing

- .1 Cure and protect concrete to CSA A23.1 unless otherwise required.

3.6 Defective Work

- .1 Concrete is defective when:
 - .1 Concrete contains excessive honeycombing or embedded debris.
 - .2 28 day strength in any defined area is less than 95% of specified strength.

3.7 Repair

- .1 Repair defective areas while concrete is still plastic, otherwise wait until curing is completed. Repair defective areas as follows:
 - .1 Chip down edges perpendicular to surface;
 - .2 Wet area and brush on 1:1 sand-cement grout;
 - .3 Patch with 1:2 sand-cement mortar with 10% hydrated lime added.
- .2 Where directed, remove defective work and replace with new concrete.
- .3 Where directed, grind off high surface irregularities.
- .4 Where, as a result of alterations, previously exterior faces become interior, water blast, clean, patch, grind, etc., the surfaces to match adjacent interior surfaces.

3.8 Patching

- .1 Patch imperfections in green concrete as follows:
 - .1 Chip down edges perpendicular to surface.
 - .2 Wet the area and brush on 1:1 cement-sand grout.
 - .3 Patch with latex modified cement mortar in accordance with manufacturer's printed instructions.

CAST-IN-PLACE CONCRETE

- .2 Patching existing concrete.
 - .1 Clean and roughen existing concrete to sound substrate. Remove all loose, disintegrated, unsound or contaminated concrete.
 - .2 Thoroughly soak substrate prior to application but eliminate standing water.
 - .3 Patch with latex modified cement mortar in accordance with manufacturer's printed instructions.

3.9 Frost Protection

- .1 After curing process is completed, provide continuous protection for slabs on grade to prevent subgrade below from freezing during cold weather. Provide heated enclosures, insulation, etc., as required.
- .2 All concrete work in below freezing conditions to be placed in a proper hoarded and heated enclosure.

3.10 Rough-In and Blockouts

- .1 The Contractor shall provide the required blockouts and chases for the installation of pipes and for any other type of equipment.

3.11 Testing

- .1 All concrete testing shall be carried out as per CSA A23.2, Methods of Test for Concrete.
- .2 Three concrete cylinders for each 100 cubic metres of concrete poured or a minimum of one set of test cylinders per day shall be taken.
- .3 The Contractor shall be responsible for the concrete cylinders upon completion of casting. The Contractor shall ensure that the cylinders are not damaged and the cylinders shall be shipped as soon as possible in crates acceptable to the testing laboratory designated by the Engineer.
- .4 All costs of crating, shipping, etc., shall be borne by the Contractor.
- .5 The cost of cylinder breaking shall be reimbursed from the Material Testing Prime Sum. Provide Engineer with copy of invoice from testing laboratory.

END OF SECTION