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**PART 1 GENERAL**

**1.1 REFERENCES**

- .1 Canadian Standards Association (CSA).
  - .1 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
- .2 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-1.2, Boiled Linseed Oil.
  - .2 CAN/CGSB-3.3, Kerosene.
- .3 American Society for Testing and Materials (ASTM).
  - .1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).

**1.2 TESTING**

- .1 Testing of concrete to CAN3-A23.1 and requirements of Section 03 30 00 – Cast-in-Place Concrete.

**1.3 ENVIRONMENTAL CONDITIONS**

- .1 If temperature is below 5°C or if Departmental Representative anticipates a temperature drop below this value within the next 24 hours, take all necessary measures to protect concrete from freezing.
- .2 Do not place concrete on frozen base.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Concrete mixes and materials: to Section 03 30 00 - Cast-in-Place Concrete, mix designed to produce a minimum compressive strength at 28 days of 35 MPa and containing 20mm nominal size aggregate, with water/cement ratio to CAN3-A23.1, Table 7 for Class C-2 exposure and 75-100mm slump at time and point of deposit, air entrainment to CAN3-A23.1, Table 9.
- .2 Reinforcing steel: to Section 03 20 00 - Concrete Reinforcing.
- .3 Joint filler to Section 03 30 00 - Cast-in-Place Concrete, 20 mm performed, non-extruding, resilient bituminous type.
- .4 Granular base: to Section 32 11 23 – Aggregate Base Courses and to Section 31 23 33.01 - Excavating, Trenching and Backfilling.

- .5 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.
- .6 Fill material: to Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .7 Clear, polyethylene film to ASTM C171, minimum thickness 0.10 mm.

### **PART 3 EXECUTION**

#### **3.1 GRADE PREPARATION**

- .1 Do grade preparation work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials. Dispose of surplus and unsuitable excavated material off site.
- .3 Place fill in maximum 150 mm layers and compact to at least 95% of maximum density to ASTM D698.
- .4 Ensure that Sub Grade, Granular Sub Base and Granular Base preparation has been inspected and approved by Departmental Representative before commencing work.

#### **3.2 GRANULAR SUB BASE**

- .1 Obtain Departmental Representative's approval of subgrade before placing granular sub base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact granular sub base to at least 100% of maximum dry density to ASTM D698.

#### **3.3 FORMING**

- .1 Form vertical surfaces to full depth using forming material that will not deform under loading by plastic concrete.
- .2 Securely position forms to required lines and grades.
- .3 Coat forms with form release agent.
- .4 Obtain approval of forms before placing concrete.
- .5 Install metal fabrication as required.

### **3.4 CONCRETE**

- .1 Obtain Departmental Representative approval of granular base and reinforcing steel prior to placing concrete.
- .2 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Finish exposed surface to a smooth, uniform finish, free of open texturing and exposed aggregate. Do not work more mortar to the surface that required. Do not use neat cement as a dryer to facilitate finishing.
- .4 Wood float finish surface to provide no-skid texture.
- .5 Immediately after floating, give sidewalk surface uniform finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line.
- .6 Provide edging as indicated with 10 mm radius edging tool.
- .7 Cure and protect concrete in accordance with CAN3-A23.1.

### **3.5 TOLERANCES**

- .1 Finish surfaces to within 3mm in 3m as measured with 3m straightedge placed on surface.

### **3.6 EXPANSION AND CONTRACTION JOINTS**

- .1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of 1.5 m.
- .2 Install expansion joints at intervals of 6 m.
- .3 Install expansion joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .4 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.
- .5 Install joint filler in expansion joints as indicated.

### **3.7 ISOLATION JOINTS**

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Install joint filler in isolation joints as indicated.

**3.8 CURING**

- .1 Cure concrete by adding moisture continuously in accordance with CAN/CSA-A23.1, to exposed finished surfaces for at least 1 day after placing.
- .2 Where polyethylene sheets are used for moist curing, place polyethylene over sufficiently hardened concrete to prevent drainage. Overlap adjacent edges 150 mm and tightly seal with sand or wood planks. Weigh sheets down to maintain close contact with concrete during the entire curing period.
- .3 Where burlap is used for moist curing, place two pre-wetted layers on concrete surface and keep continuously wet during curing period.

**3.9 BACKFILL**

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material approved by Departmental Representative. Compact and shape to required contours as indicated or as directed by Departmental Representative.

**END OF SECTION**