

**PART 1 - GENERAL**

- 1.1 RELATED SECTIONS
- .1 Section 013529.06 – Health and Safety Requirements
  - .2 Section 017421 – Construction/Demolition Waste Management and Disposal
  - .3 Section 310516 – Aggregate Materials
  - .4 Section 311123 - Aggregate Base Courses
  - .5 Section 321615 – Concrete Walks, Curbs Gutters and Medians
- 1.2 MEASUREMENT FOR PAYMENT
- .1 No measurement for payment will be made under this section. Include costs in items where required including all labour, materials and equipment.
- 1.3 REFERENCES
- .1 Reference Standards:
    - .1 ASTM International
      - .1 ASTM C 260-06, Standard Specification for Air-Entraining Admixtures for Concrete.
      - .2 ASTM C 309-07, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
      - .3 ASTM C 494/C 494M-08a, Standard Specification for Chemical Admixtures for Concrete.
      - .4 ASTM C 1017/C 1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
      - .5 ASTM D 412-06ae1, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
      - .6 ASTM D 624-00(2007), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
      - .7 ASTM D 1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
      - .8 ASTM D 1752-04a, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
    - .2 Canadian General Standards Board (CGSB)
      - .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
      - .2 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
    - .3 CSA International
      - .1 CSA A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

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- .2 CSA A283-06, Qualification Code for Concrete Testing Laboratories.
    - .3 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - 1.4 ADMINISTRATIVE REQUIREMENTS .1 Pre-installation Meetings: in accordance with Section 013216.06 - Construction Progress Schedule - Critical Path Method (CPM), convene pre-installation meeting one week prior to beginning concrete works.
    - .1 Ensure key personnel, site supervisor, Departmental Representative, specialty contractor – finishing/forming attend.
    - .1 Confirm project requirements.
  - 1.5 ACTION AND INFORMATIONAL SUBMITTALS .1 Provide submittals in accordance with Section 013300 - Submittal Procedures.
    - .2 Provide testing results and reports for review by Departmental Representative Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
    - .3 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken.
    - .4 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.
    - .5 Provide two copies of WHMIS MSDS in accordance with Section 013529.06 - Health and Safety Requirements 013543 - Environmental Procedures.
  - 1.6 QUALITY ASSURANCE .1 Quality Assurance: in accordance with Section 014500 - Quality Assurance.
    - .2 Provide Departmental Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
      - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
    - .3 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
      - .1 Curing.
      - .2 Finishes.
      - .3 Joints.
    - .4 Quality Control Plan: provide written report to Departmental Representative confirming compliance that concrete in place

meets performance requirements of concrete.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
    - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
    - .2 Deviations to be submitted for review by Departmental Representative.
  - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

**PART 2 - PRODUCTS**

2.1 DESIGN CRITERIA

- .1 Performance: to CSA A23.1/A23.2.

2.2 PERFORMANCE CRITERIA

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance.

2.3 MATERIALS

- .1 Portland Cement: to CSA A3001, Type GU.
- .2 Water: to CSA A23.1.
- .3 Aggregates: to CSA A23.1/A23.2.
- .4 Admixtures:
  - .1 Air entraining admixture: to ASTM C 260.
  - .2 Chemical admixture: to ASTM C 494 ASTM C 1017. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .5 Curing compound: to CSA A23.1/A23.2 white.
- .6 Premoulded joint fillers: Bituminous impregnated fiber board: to ASTM D 1751

2.4 MIXES

- .1 Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
  - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
    - .1 Compressive strength at 28 days: 35 Mpa minimum.
    - .2 Workability: free of surface blemishes and segregation.
- .2 Provide quality management plan to ensure verification of concrete quality to specified performance.

- .3 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- .1 Obtain Departmental Representative's written approval before placing concrete.
  - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .3 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .4 Protect previous Work from staining.
- .5 Clean and remove stains prior to application for concrete finishes.
- .6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .7 Do not place load upon new concrete until authorized by Departmental Representative.
- .8 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
  - .1 Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout to anchor and hold dowels in positions as indicated.

#### **3.2 INSTALLATION APPLICATION**

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
  - .1 Finishing and curing:
    - .1 Finish concrete to CSA A23.1/A23.2.
    - .2 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
    - .3 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.
- .2 Joint fillers:
  - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.
  - .2 When more than one piece is required for joint, fasten

abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Locate and form expansion joints per OPSD Standards.

.4 Install joint filler.

.5 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

3.3 SURFACE TOLERANCE

.1 Concrete tolerance to CSA A23.1.

3.4 FIELD QUALITY CONTROL

.1 Site tests: conduct tests as follows in accordance with Section 014500 - Quality Assurance and submit report for the following:

.1 Concrete pours.

.2 Slump.

.3 Air content.

.4 Compressive strength at 7 and 28 days.

.5 Air and concrete temperature.

.2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.

.1 Ensure laboratory is certified to CSA A283.

.3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.

.4 Contractor will pay for costs of tests as specified in Section 012983 - Payment Procedures for Testing Laboratory Services.

.5 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.6 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.

.7 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.5 CLEANING

.1 Clean in accordance with Section 017411 - Cleaning.

.1 Divert unused concrete materials to local quarry.

.2 Provide appropriate area on job site where concrete trucks can be safely washed.

.3 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by Departmental Representative.

.4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

.5 Prevent admixtures and additive materials from entering drinking water supplies or streams.

- .6 Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal.
- .7 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

**\*\*\* END OF SECTION \*\*\***