

**Part 1 General****1.1 REFERENCES**

- .1 ASTM International
  - .1 ASTM A1064/A1064M-14, Standard Specification for Carbon Steel Wire and Welded Wire Reinforcement, Plain and Deformed for Concrete.
  - .2 ASTM D1751-04(2013)e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
- .2 CSA International
  - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete.
  - .2 CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .3 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
  - .4 CSA O86-14, Engineering Design in Wood.
  - .5 CSA O121-08(R2013), Douglas Fir Plywood.
  - .6 CSA O153-13, Poplar Plywood.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 00 10 – General Instructions.
- .2 Shop Drawings:
  - .1 Submit placing drawings prepared in accordance with plans to clearly show size, shape, location and necessary details of reinforcing.
  - .2 Submit drawings showing formwork and falsework design to: CSA A23.1/A23.2.
  - .3 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario Canada.
- .3 Provide results for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .4 Provide two copies of WHMIS MSDS in accordance with Section 01 00 10 – General Instructions.

**1.3 QUALITY ASSURANCE**

- .1 Quality Assurance: In accordance with Section 01 00 10 – General Instructions.
- .2 Upon request provide Departmental Representative 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 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements.

**1.4 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 the 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 Alternative 1 - Performance to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

**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 as described in PART 1 - QUALITY ASSURANCE.

**2.3 MATERIALS**

- .1 Cement: to CSA A3001, Type GU.
- .2 Hydraulic cement: Type GUb to CSA-A3001.
- .3 Water: to CSA A23.1/A23.2.
- .4 Aggregates: to CSA A23.1/A23.2.
- .5 Formwork materials:
  - .1 For exposed surfaces use square-edged, smooth surfaced panels true in plane, free of holes, surface markings and defects
  - .2 For concrete without special architectural features, use wood and wood product formwork materials to CSA O86, CSA O121, and CSA O153.
- .6 Reinforcing bars: to CSA G30.18, Grade 400.
- .7 Premoulded joint filler:
  - .1 Bituminous impregnated fibreboard: to ASTM D1751.
- .8 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
  - .1 Compressive strength: 35 MPa at 28 days.
  - .2 Net shrinkage at 28 days: maximum 0.04%.

- .9 Non-shrink pre-mixed dry pack grout: composition of non-metallic aggregate, non-chloride Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 35 MPa at 28 days.

## **2.4 MIXES**

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
  - .1 Provide concrete mix to meet following hard state requirements:
    - .1 Durability and class of exposure: N.
    - .2 Compressive strength at 28 days: 30 MPa minimum.
    - .3 Intended application: housekeeping pads.
    - .4 Aggregate size: 20 mm maximum.
    - .5 Volume stability: acceptable volume change range 0.04 due to shrinkage, creep and freeze thaw cycle.
    - .6 Provide quality management plan to ensure verification of concrete quality to specified performance.
  - .2 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Provide Departmental Representative 24 hours notice before each concrete pour.
- .2 Place concrete reinforcing as indicated on placing drawings and in accordance with CSA A23.1/A23.2.
- .3 During concreting operations development of cold joints not allowed.
- .4 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .5 Protect previous Work from staining.
- .6 Clean and remove stains prior to application of concrete finishes.

### **3.2 INSTALLATION/APPLICATION**

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.
- .2 Sleeves and inserts:
  - .1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.
  - .2 Sleeves and openings greater than 100 mm x 100 mm not indicated must be reviewed by Departmental Representative.

### **3.3 FINISHES**

- .1 Formed surfaces exposed to view: in accordance with CSA A23.1/A23.2.
- .2 Equipment pads: provide smooth trowelled surface.

**3.4 CONTROL JOINTS**

- .1 Cut control joints in slabs on grade at locations indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler.

**3.5 EXPANSION AND ISOLATION JOINTS**

- .1 Install premoulded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1/A23.2.

**3.6 CURING**

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

**3.7 SITE TOLERANCES**

- .1 Concrete floor slab finishing tolerances to CSA A23.1/A23.2.

**3.8 FIELD QUALITY CONTROL**

- .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative.

**3.9 CLEANING**

- .1 Use trigger operated spray nozzles for water hoses.
- .2 Designate cleaning area for tools to limit water use and runoff.
- .3 Provide appropriate area on job site where concrete trucks and be safely washed.
- .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.

**END OF SECTION**