

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 34 – Conduits, conduit fastenings and conduit fittings

1.2 MEASUREMENT PROCEDURES

- .1 There shall be no measurements to be done for this section. All necessary costs for cast-in-place concrete will be included in the item where these types of Work are required.

1.3 REFERENCES

- .1 Reference Standards:
 - .1 ASTM International
 - .1 ASTM-C260-10, Standard Specification for Air-Entraining for Concrete Admixtures
 - .2 ASTM-C494/C494M-13, Standard Specifications for Chemical Admixtures for Concrete.
 - .2 CSA International
 - .1 CSA A23.1-09, Concrete Materials and Methods of Concrete Construction.
 - .2 CSA A23.2-09, Methods of Test and Standard Practices for Concrete.
 - .3 CSA A5-93, Portland cement

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide testing results and reports for review by 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 as described in PART 3 - FIELD QUALITY CONTROL.
- .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 01 35 43 - Environmental Procedures.

1.5 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Falsework erection.
 - .2 Curing.
 - .3 Formwork removal.

- .3 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.
- .4 Sustainability Standards Certification:
 - .1 Construction Waste Management: provide copy of plan.

1.6 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.
 - .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Cement: to CAN/CSA A5.
- .2 Supplementary hydraulic cement: to CAN/CSA A23.5.
- .3 Water: to CSA A23.1.
- .4 Aggregates: to CSA A23.1/A23.2.
- .5 Air entraining admixture: to ASTM C260.
- .6 Reinforcing steel bars: dimensions to plans.

2.2 MIXES

- .1 Ensure materials used in concrete mix have been submitted for testing and meet requirements of CSA A23.1.

Type	Compressive strength 28 days (MPa)	Cement min. mass (kg/m ³) Type 10	Water/ binding ratio max.	Slump ± 30 mm before superplastifiant		Large aggregates (mm)	Air content (%)	Use
				± 20 mm	± 30 mm			
1	32	390	0.45		80	5-20	5-8%	Concrete base
2	20	340	0.45		75-100	10	5-8%	Concrete ducts for electrical conduits

- .2 Do not modify mix of concrete before receiving approval from Departmental Representative.

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 Place concrete reinforcing in accordance to plan details.
- .3 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.
- .4 Pumping of concrete is permitted only after approval of equipment and mix.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing .
- .7 Protect previous Work from staining.
- .8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .9 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
 - .1 Place steel dowels and pack solidly with shrinkage compensating grout to anchor and hold dowels in positions as indicated.
- .10 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts:
 - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
 - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .3 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .4 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts:
 - .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
 - .2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.
 - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
 - .4 Set bolts and fill holes with shrinkage compensating grout.

- .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2.
 - .2 Use procedures as reviewed by Departmental Representative to remove excess bleed water. Ensure surface is not damaged.
 - .3 Provide float finish unless otherwise indicated
 - .4 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.

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 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .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.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.
- .4 Departmental Representative will pay for costs of tests as specified in Section 01 29 83 - 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 Consultant will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Divert unused concrete materials from landfill to local facility after receipt of written approval from Departmental Representative.
 - .2 Provide appropriate area on job site where concrete trucks and be safely washed.
 - .3 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.
 - .4 Prevent admixtures and additive materials from entering drinking water supplies or streams.
 - .5 Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal.
 - .6 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

END OF SECTION