

**Part 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 20 00 Concrete Reinforcing
- .2 Section 03 30 00 Cast- in- Place Concrete

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-09, Engineering Design in Wood.
  - .3 CSA O121-08, Douglas Fir Plywood
  - .4 CAN/CSA-O325-07, Construction Sheathing.
  - .5 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
  - .6 CAN/CSA-S269.3-M92(R2008), Concrete Formwork, National Standard of Canada
  - .7 ASTM C1059/C1059M-99 (2008), Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Apply and obtain Department of Environmental approval for work along side and/or in water work. Submit to Department Representative 4 weeks prior to start of Work.
- .3 Submit shop drawings for formwork and falsework.
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.
  - .2 Indicate method and schedule of construction, materials, arrangement of joints, ties, shores, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings and with CAN/CSA-S269.3 for formwork drawings
  - .3 Submit method approved by Department of Environment of containing wet concrete and keeping the concrete from contaminating local water courses.
  - .4 Submit WHMIS MSDS - Material Safety Data Sheets

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Store and manage hazardous materials in accordance with Nova Scotia Environment Regulations
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse, recycle or disposal with approval of Department Representative.
  - .2 Place materials defined as hazardous or toxic in designated containers.
  - .3 Divert wood materials from landfill to a reuse, composting facility as approved by Departmental Representative.
  - .4 Divert plastic materials from landfill to a recycling facility as approved by Departmental Representative.
  - .5 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

**Part 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Formwork materials:
  - .1 For concrete use wood and wood product formwork materials to CAN/CSA-O86.1.
- .2 Form ties:
  - .1 For concrete use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
- .3 Form liner:
  - .1 Plywood: medium density overlay Douglas Fir to CSA O121.
- .4 Form release agent: non-toxic, biodegradable.
- .5 Falsework materials: to CSA-S269.1.
- .6 Latex modified bonding agent: to ASTM C1059/C1059M-99

**Part 3 EXECUTION**

**3.1 FABRICATION AND ERECTION**

- .1 It is the responsibility of the contractor to obtain all approvals necessary to work at the water's edge or in the water.

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## CONCRETE FORMING AND ACCESSORIES

Still Brook, Effies Brook, Halfway Brook,  
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- .2 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .3 Obtain Departmental Representative's approval for use of earth forms framing openings not indicated on drawings.
- .4 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .5 Fabricate and erect falsework in accordance with CSA S269.1.
- .6 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .7 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .8 Align form joints and make watertight.
  - .1 Keep form joints to minimum.
- .9 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .10 Form, slots, openings, drips, recesses, expansion and control joints as indicated.
- .11 Build in anchors, sleeves, and other inserts required to accommodate work specified in other sections.
  - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated.
- .12 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

### **3.2 REMOVAL AND RESHORING**

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
  - .1 7 days
- .2 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

**END OF SECTION**

**Part 1 GENERAL**

**1.1 WORK INCLUDED**

- .1 This section specifies requirements for supplying, removals of existing and installing new laminated elastomeric bridge bearings for bridge structures.

**1.2 REFERENCES**

- .1 Nova Scotia Transportation and Infrastructural Renewal (NSTIR) Standard Specification for Highway Construction and Maintenance (current edition)
- .2 CAN/CSA S6-06 Canadian Highway Bridge Design Code.
- .3 OPSS-1202-2008 Ontario Provincial Standard Specification for the Material Specification of Bearings -Elastomeric Plain and Steel Laminated.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 At least 4 weeks prior to beginning Work, provide Departmental Representative with samples of materials if requested.
- .3 Provide Departmental Representative a minimum 4 weeks prior to starting installation 2 copies of the manufacture's product information
- .4 At least 4 weeks prior to beginning Work, provide Departmental Representative for approval with drawings stamped and signed by professional engineer registered and licensed in Province of Nova Scotia. Drawings are to show:
  - .1 Method of placement of jacking frame arrangement
    - .1 Material thickness, dimensions of material, size of frame
    - .2 Location with regard to existing structure
    - .3 Method of attaching to existing structure
  - .2 Scheduling of events detail
  - .3 Method of removing existing bearings
  - .4 Method of placing new bearings
  - .5 The maximum proposed lift of the bridge
  - .6 The maximum differential lift of the bridge

**Part 2 PRODUCTS**

**2.1 PERFORMANCE CRITERIA**

- .1 Quality Control Plan: ensure bearing supplier meets performance criteria as established
  - .1 CAN/CSA S6-06 Canadian Highway Bridge Design Code.
  - .2 OPSS-1202-2008 Ontario Provincial Standard Specification for the Material Specification of Bearings -Elastomeric Plain and Steel Laminated.

**2.2 MATERIALS**

- .1 Fixed Bearings
  - .1 Size: 250 mm x 450 mm x 40 mm thick
  - .2 Elastomer: Polyisoprene (natural rubber) or polychloroprene (neoprene) compound.
  - .3 Durometer Hardness: 60
  - .4 Laminated
  - .5 Provide two (2) slots in bearing material to accommodate existing dowels: exact dimensions are to be verified in field as shown on the drawings.
- .2 Free Bearings:
  - .1 Size: 250 mm x 450 mm x 40 mm thick.
  - .2 Elastomer: Polyisoprene (natural rubber) or polychloroprene (neoprene) compound.
  - .3 Durometer Hardness: 60
  - .4 Laminated
  - .5 Provide two (2) penetrations, extending 20 mm into bearing pads from the bottom, 44 mm diameter, located as shown on the drawings.

**Part 3 EXECUTION**

**3.0 Installation**

- .1 See Dwg 4 “Half way Brook Bridge Site Plan, Elevation, and Section” for suggested sequence for installation of bearings.

**END OF SECTION**

**Part 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 00 00 Concrete Forming and Accessories.
- .2 Section 03 30 00 Cast- in- Place Concrete

**1.2 REFERENCES**

- .1 American Concrete Institute (ACI)
  - .1 SP-66-04, ACI Detailing Manual 2004.
- .2 ASTM International
  - .1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - .2 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - .3 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .3 CSA International
  - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
  - .3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
  - .4 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .5 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .6 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
  - .1 RSIC-[2004], Reinforcing Steel Manual of Standard Practice.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:

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## CONCRETE REINFORCING

Still Brook, Effies Brook, Halfway Brook,  
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- .1 Submit drawings including placement drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia Canada.
  - .1 Indicate placing of reinforcement and:
    - .1 Bar bending details.
    - .2 Lists.
    - .3 Quantities of reinforcement.
    - .4 Sizes, spacing, locations of reinforcement and mechanical splices if approved by Departmental Representative with identifying code marks to permit correct placement without reference to structural drawings.
    - .5 Indicate sizes, spacing and locations of chairs, spacers and hangers.
  - .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated
    - .1 Provide type B unless otherwise indicated.

### 1.4 **QUALITY ASSURANCE**

- .1 Upon request, provide Department Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.
- .2 Upon request, provide Department Representative of proposed source of material to be supplied.

### 1.5 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground in a clean dry location and in accordance with manufacturer's recommendations.
  - .2 Replace defective or damaged materials with new.

## **Part 2 PRODUCTS**

### **2.1 MATERIALS**

- .1 Substitute different size bars only if permitted in writing by Departmental Representative
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.

- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Cold-drawn annealed steel wire ties: to CSA G30.3.
- .5 Deformed steel wire for concrete reinforcement: to ASTM A82/A82M.
- .6 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .7 Mechanical splices: subject to approval of Departmental Representative.
- .8 Plain round bars: to CSA-G40.20/G40.21.

## **2.2 FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 ANSI/ACI 315 Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada
- .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

## **Part 3 EXECUTION**

### **3.1 FIELD BENDING**

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

### **3.2 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease
- .4 Ensure cover, as indicated on drawings, to reinforcement is maintained during concrete pour.
- .5 Protect paint coated portions of bars with covering during transportation and handling.

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CONCRETE REINFORCING

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- .6 Reinforcing bars shall be firmly fastened in place to maintain installed position during placing of concrete
- .7 Reinforcing bars at the time concrete is placed will be free from loose flaky rust, oil or other coatings which will destroy or reduce the bond

**3.3 FIELD TOUCH-UP**

- .1 Touch up damaged and cut ends of galvanized reinforcing steel with compatible finish to provide continuous coating.
- .2 Waste Management: separate waste materials for recycling.

**END OF SECTION**

**Part 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 10 00 Concrete Formwork
- .2 Section 03 20 00 Concrete Reinforcement

**1.2 REFERENCES**

- .1 Nova Scotia Transportation and Infrastructural Renewal (NSTIR) Standard Specification for Highway Construction and Maintenance (current edition).
- .2 ASTM International
  - .1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
  - .2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - .3 ASTM C494/C494M-13, Standard Specification for Chemical Admixtures for Concrete.
  - .4 ASTM C1017/C1017M-13, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
  - .5 ASTM D1751-04(2013), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  - .6 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .7 CAN3-A266.1-M78, Air-Entraining Admixtures for Concrete.
  - .8 CAN3-A266.4-M78, Guidelines for the use of Admixtures in Concrete
  - .9 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 At least 4 weeks prior to beginning Work, provide Departmental Representative with:
  - .1 A signed copy of a design for a concrete mix with the necessary admixtures to **allow for a 4 hr set time** to permit mixing, travel and placement
  - .2 Samples of materials if requested

- .3 Provide testing reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .4 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature, travel and placement time and test samples taken.

#### **1.4 QUALITY ASSURANCE**

- .1 Provide if requested Departmental Representative a minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
- .2 Provide if requested Departmental Representative 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 Falsework erection.
  - .2 Hot weather concrete.
  - .3 Curing.
  - .4 Finishes.
  - .5 Formwork removal.
  - .6 Joints.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharged within design minutes maximum after batching.
    - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and laboratory representative and concrete producer as described in CSA A23.1/A23.2.
  - .2 No water is to be added to concrete after leaving batching plant.

### **Part 2 PRODUCTS**

#### **2.1 DESIGN CRITERIA**

- .1 CSA A23.1/A23.2
- .2 High Early Strength Concrete – The high early strength concrete shall conform to one of the following:

- A. The Contractor shall design and submit to the Engineer for approval a high early strength concrete mix. This mix shall be air-entrained, and shall be composed of Portland cement, fine and coarse aggregates, approved admixtures and additives, and water. The mix shall contain between 4 and 7 percent-entrained air, and shall attain a 24-hour compressive strength of 20 MPa. Additionally, the mix shall contain shrinkage compensating additives such that there will be no separation of the patched area from the parent concrete. This shrinkage-compensating additive shall be utilized so as to produce expansion in the high early strength concrete of no more than 3 percent.
- B. In lieu of the above high early strength concrete mix, the Contractor may propose the use of a proprietary type mix that will meet the same physical requirements as those stated above. A mix design shall be submitted for this material, stating the percentage of each component to be utilized.
  - .3 .1 Regardless of the type of high early strength concrete proposed by the Contractor, substantive data that demonstrates the ability of the material to meet the specification requirements shall be submitted with the proposed mix design at least two weeks prior to its use.
  - .4 .2 Proportion normal density concrete in accordance with CAN/CSA-A23.1, to give following properties for all concrete:
    - .1 Cement:
      - .1 Type 30 Portland cement.
      - .2 Minimum compressive strength at 24 hrs: 20 MPa.
      - .3 Minimum compressive strength at 28 days: 35 MPa.
      - .4 Maximum W/C Ratio: 0.4
      - .5 Class of exposure: C1.
      - .6 Nominal size of coarse aggregate: 19 mm.
      - .7 Slump at time and point of discharge: 50 to 75 mm.
      - .8 Air content: 4 to 7%.
      - .9 Chemical admixtures: in accordance with CAN3-A266.4.
    - .5 Weep hole tubes: plastic.

**Part 3 EXECUTION**

**3.1 PREPARATION**

- .1 Obtain Departmental Representative's approval before placing concrete.
- .2 Provide 24 hours minimum notice prior to placing of concrete.

- .3 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .4 During concreting operations:
- .5 Development of cold joints not allowed.
- .6 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .7 Pumping of concrete is permitted only after approval of equipment and mix.
- .8 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .9 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .10 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, and air temperature and test samples taken.
- .11 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
- .12 Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
- .13 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 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 Formed holes: 100 mm minimum diameter.
  - .4 Drilled holes: to manufacturers' recommendations 25 mm minimum diameter larger than bolts used.
  - .5 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
  - .6 Set bolts and fill holes with epoxy grout.
- .3 Drainage holes and weep holes:

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CAST-IN-PLACE CONCRETE

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- .1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories. If wood forms are used, remove them after concrete has set.
- .2 Install weep hole tubes and drains as indicated on Drawings.
- .4 Finishing and curing:
  - .1 Finish concrete to CSA A23.1/A23.2.
  - .2 Use procedures as those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.

**3.3 FIELD QUALITY CONTROL**

- .1 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by and at the option of the Departmental Representative for review to CSA A23.1/A23.2. - including
  - .1 Slump.
  - .2 Air content.
  - .3 Compressive strength at 7 and 28 days.
  - .4 Air and concrete temperature.
- .2 Inspection or testing by Department Representative will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

**3.4 CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .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 Using appropriate safety precautions collect liquid or solidify liquid with inert, non-combustible material and remove for disposal.
- .4 Dispose of waste in accordance with applicable local, provincial and Federal regulations.

**END OF SECTION**

**Part 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 10 00 Concrete Formwork
- .2 Section 03 20 00 Concrete Reinforcement

**1.2 REFERENCES**

- .1 ASTM
  - .1 ANSI/ACI 117-81, Tolerances for Concrete Construction and Materials.
  - .2 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
  - .3 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - .4 ASTM C494/C494M-13, Standard Specification for Chemical Admixtures for Concrete.
  - .5 ASTM C1017/C1017M-13, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
  - .6 ASTM D1751-04(2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  - .7 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .8 CAN3-A266.1-M78, Air-Entraining Admixtures for Concrete.
  - .9 CAN3-A266.4-M78, Guidelines for the use of Admixtures in Concrete
  - .10 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .11 ASTM C920 Specifications for Elastometric Joint Sealants
  - .12 ASTM C 1299 Guide for use in Selection of Liquid-Applied Sealants

**1.3 WORK DESCRIPTION**

- .1 Work includes;
  - .1 Repairs to larger surfaces with high strength mortar
  - .2 Repairs to cracks by use of a polyurethane sealant
- .2 For location and description of repairs see individual bridge drawings

**1.4 PRICE AND PAYMENT PROCEDURES**

- .1 Measurement Procedures: in accordance with Section 01 29 00 - Payment Procedures.

**1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 At least 4 weeks prior to beginning Work, provide Departmental Representative with
  - .1 Samples of materials if requested:
  - .2 Provide two copies of WHMIS MSDS for all materials.
  - .3 Provide two copies of manufacturer's performance specification and application instructions for each repair type.

**Part 2 PRODUCTS**

**2.1 High Strength Patching Mortar**

- .1 The high strength mortar patching compound shall be a one component, add water only, hydraulic cement based, polymer modified and silica-fume enhanced, fibre-reinforced mortar suitable for form and pour applications.
  - .1 Minimum Physical Requirements:
    - .2 Compressive Strength @ 3 Days 24-28 MPa
    - @ 7 Days 28-32 MPa
    - @ 28 Days 34-38 MPa
    - .3 Modulus of Rupture 7.5-9.5 MPa
    - .4 Slant Shear Strength 16.5 - 18.5 MPa
    - .5 Bond Strength with Concrete >1.4 MPa
    - .6 Rapid Chloride Permeability < 980 Coulombs
    - .7 Salt Scaling 0.08 g/cm<sup>2</sup>
    - .8 Freeze/Thaw Durability < 1% weight loss
  - .2 Acceptable Products:
    - .1 Fibre-Patch RM ST by Gemite
    - .2 Planitop X by Mapei.
    - .3 Sikatop 123 Plus by Sika

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## HIGH STRENGTH PATCHING MORTAR

Still Brook, Effies Brook, Halfway Brook,  
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- .3 Reinforcing Rustproofing/Bonding Agent:  
The reinforcing rustproofing compound shall be a two component (dry component A, liquid component B), corrosion inhibiting compound suitable for both anodic and cathodic corrosion sites.
- .4 The following are the minimum physical properties which shall be the standards for selecting a reinforcing rustproofing compound:
- |    |                                    |                  |
|----|------------------------------------|------------------|
| .1 | Compressive Strength               | 30 MPa           |
| .2 | Adhesion to Steel                  | 3.5 MPa          |
| .3 | Freeze/Thaw Resistance             | 0% loss          |
| .4 | Resistance to Chloride Penetration | 430-520 Coulombs |
- .5 Acceptable products:
- |    |  |
|----|--|
| .1 | Fibre-Prime by Gemite                      |
| .2 | Corr-Bond by Euclid                        |
| .3 | Sikatop Armetec 110 or approved equivalent |

### 2.2 Polyurethane Sealant

- .1 The high performance polyurethane sealant shall be type M, grade NS, class 25 capable of resisting ultraviolet light and extreme temperatures. A single component sealant is acceptable for cracks less than ½ inch. A multicomponent sealant system is to be used on cracks greater than ½ inch.

## Part 3 EXECUTION

### 3.1 PREPARATION

- .1 Obtain Departmental Representative's approval before Patching Mortar and applying sealant.
- .2 Provide 24 hours minimum notice prior to placing of concrete and sealant.

### 3.2 GENERAL

- .1 Remove all deteriorated concrete as indicated in the details on the drawings. Sandblast, dirt and other bond inhibiting materials to achieve sound concrete with exposed aggregate. Straight lines with a vertical edge of minimum 10 mm must be provided around the perimeter of the patch by saw cutting.
- .2 Remove concrete behind exposed reinforcing bars to a minimum depth of 100 mm. Remove loose rust from the surface of the reinforcing bars using a wire brush or other mechanical means.

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## HIGH STRENGTH PATCHING MORTAR

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- .3 If there is rust evident on the rebar at the junction where it meets the existing concrete, with the approval of the Department Representative, remove an additional 100 mm of concrete along the rebar.
- .4 Do not apply patching compounds when the ambient temperature is expected to go below 4°C within the next 24 hour period or when rain is imminent. Use hot weather concreting precautions when applying in temperatures exceeding 25°C or under sunny or windy conditions.
- .5 Mix the high strength patching compound as per the Manufacturer's written instructions. Do not over mix.
- .6 Thoroughly saturate the surface to be patched with clean potable water to obtain a saturated surface dry substrate. Apply two coats of reinforcing rustproofing/bonding agent prior to placing high strength patching materials. Install formwork as detailed. Pour mortar into formwork before bonding agent dries. Fully vibrate formwork to ensure the mortar fills all voids.
- .7 Wet cure for 24 hours and then air dry cure. Protect against rapid surface evaporation under hot, sunny and windy conditions by using a surface evaporation retarder or wetting the surface prior to the final set. Curing compounds may be used as per the Manufacturer's written instructions.

### **3.3 Placement of mortar and sealant**

- .1 Placement of products are follow manufactures written instructions

### **3.4 CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for reuse or recycling
- .3 Dispose of waste in accordance with applicable local, provincial and National regulations.

**END OF SECTION**