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**IMPRESSED CAST-IN-PLACE CONCRETE**

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**PART 1 GENERAL****1.1 Related Work**

- .1 All Division 1 Specification Sections
- .2 Section [02233](#) Granular Base
- .3 Section [02311](#) Site Grading

**1.2 Standards**

- .1 Concrete materials and methods of construction: to CAN/CSA-A23.1 (M90), and OPSS standards.

**1.3 Testing**

- .1 Concrete testing: to CAN/CSA-A23.2 - (M90) by testing laboratory designated and paid for by Contractor through testing allowance.

**1.4 Quality Assurance**

- .1 All work shall be performed as per plans and specifications and shall include but not be limited to the supply of all materials such as granular, concrete, colour hardeners, imprinting tools and Sealants.
- .2 Samples shall be provided for approval by the Consultant along with references of past installations, which are comparable, in terms of size and complexity. A colour sample shall be provided for all requests for approved equivalents. For construction, an on-site mockup shall be provided, at a minimum of 1 metre square and shall be poured, finished, washed and sealed for Owner approval prior to commencement. Samples shall remain in place until project completion and acceptance of all Impressed Cast-in-place Concrete.
- .3 The concrete contractor must satisfy the Consultant requirements in respect to job site supervisor, equipment and qualified labour force that has worked with the above mentioned materials and able to meet necessary deadlines. The contractor must have a minimum of 5 years experience applying and finishing colour hardeners on exterior concrete finishes.
- .4 All materials used shall be outlined on a formal Tech-Data sheet for future information.

**1.5 Grade Work**

- .1 The Contractor shall be responsible for all fine grade up to 125 mm depth.
- .2 All granular base shall be fine graded to ensure contract concrete

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thickness. Uneven fine grade will not be accepted.

**PART 2 PRODUCTS****2.1 Materials**

- .1 Concrete: shall be 30 MPa compressive strength with 5-7% air entrainment. The City of Brampton does not accept slag in the concrete mix design.
- .2 Concrete coarse aggregate shall consist of a blend of 10mm and 20mm crushed limestone aggregate.
- .3 All mixing water shall be fresh, clean and potable.
- .4 Concrete slump shall not exceed 100mm without the use of a high range water reducers.
- .5 Portland cement: to CAN/CSA-A5 - (93), Type (10).
- .6 Shrinkage compensating grout: pre-mixed, non-metallic aggregate, 50 MPa compressive strength at 28 days.
- .7 Pre-molded joint filler: bituminous impregnated fibreboard to ASTM D1751-83 (1991). Use Seal-tite System by R.W. Meadows or approved equivalent.
- .8 Joint Sealant: bituminous joint Sealant (tubeform), bituminous tack coat
- .9 Concrete Sealant: QC-18 Acrylic Concrete Sealant, distributed by Form & Build Supply (1-800-563-2285) or approved equivalent.
- .10 Powder Release: QC Powder Release (Cocoa Brown colour), distributed by Form & Build Supply 1-800-563-2285, or approved equivalent.
- .11 All other materials: to CAN/CSA-A23.1-M90.

**2.2 Mix Proportions**

- .1 Method: Alternative (1) of CAN-CSA-A23.1 - (M90).
- .2 Cement type: as specified under 2.1. Class C-2.
- .3 Minimum 28 day compressive strengths and exposure classifications:
- .4 Pavements, walks, curbs and exposed site concrete: 30 MPa; C-2.

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- .5 Nominal size of coarse aggregate: Clause 14 of CAN/CSA-A23.1 - (M90)
- .6 Slump: to Table 6 of CAN/CSA-A23.1 - M90.
- .7 Air content: all concrete to contain purposely entrained air in accordance with Table 10 of CAN/CSA-A23.1 (M90). Minimum 5%-7% air entrainment.
- .8 Admixtures: to Clause 6 of CAN/CSA-A23.1 (M90).

**2.3 Colours**

- .1 To be confirmed by Consultant unless otherwise specified.

**2.4 Alternative Colours**

- .1 To be confirmed by Consultant unless otherwise specified.

**2.5 Patterns**

- .1 To be confirmed by Consultant unless otherwise specified.

**PART 3 EXECUTION****3.1 Installation**

- .1 Sidewalks: Installation shall conform to OPSD 310.010 (Concrete Sidewalk), 310.020 (Concrete Sidewalk Adjacent to Curb and Gutter), and 310.030 (Concrete Sidewalk Ramps at Intersections).
- .2 Curb: Installation shall conform to OPSD 600.080, a 50 mm lip shall be included along the back edge to support the concrete pad.
- .3 Notification: Notify the Consultant at least twenty-four (24) hours before commencing to place concrete. Regardless of any requirement of reference standards to inspect all of the work prior to placing concrete, field review of construction will be in accordance with sampling program.

**3.2 Colour Hardener Application**

- .1 Application of colour hardener shall consist of two applications to equal 55lbs per 100 square feet. The first application of colour hardener shall consist of 2/3 the specified rate and must be floated

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into the moist concrete. The second application of colour hardener shall be applied, floated then lightly trowelled prior to the imprinting procedure.

- .2 A surface retarder may be applied if required as approved by the Consultant. Water is not permitted.

**3.3 Release Agent Application**

- .1 Apply powder release agent evenly over freshly trowelled concrete surface. At no time shall the release agent be floated or trowel led into the wet concrete surface. Release agent shall be applied to concrete in such a way as to not mar or affect the smooth trowelled concrete surface.
- .2 The use of expansion joint fiber board shall only be used when new concrete is to be poured against two adjacent concrete surfaces at which point only the side other than the existing curb shall receive the fibre board. Plastic sheeting is to be used against all existing concrete curbs to ensure there is not bond. The following day, cut between the existing curb and new concrete with a diamond blade saw to remove plastic and to ensure a clean joint.
- .3 Cut all imprinted concrete along existing curbs at each existing curb cut, and once between half the distance of the existing curb cuts. Saw cut shall follow imprinted pattern line closest to each existing curb cut and shall be a minimum of 1/3 the depth of concrete.
- .4 Asphalt impregnated expansion joint shall be installed perpendicular to existing curb cuts within 30-meter intervals.
- .5 Place fibre expansion joints as per OPSD 310.020 (Concrete Sidewalk Adjacent to Curb and Gutter).
- .6 Where concrete is installed adjacent to asphalt surfacing, a bituminous tack coat will be applied to the sides of the concrete as per manufacturer's specifications, if installed *prior* to asphalt. If concrete is installed *after* asphalt, a bituminous joint Sealant (tubeform) will be used and installed as per manufacturer's specifications.
- .7 Do not trowel dummy or contraction joints. Saw cut control joints **along pattern lines** and match saw cuts in concrete curbing. Saw cuts shall be 1/3 the depth of the concrete.

**3.4 Curing**

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- .1 Cure and protect concrete in accordance with CAN/CSA-A23.1 - M90, except that curing compounds shall not be used where bond is required by subsequent topping or coating.

**3.5 Sealant**

- .1 All imprinted concrete surfaces shall be treated with a deep penetrating approved sealant - MATTE FINISH.
- .2 All coloured concrete shall be sealed with QC-18 Acrylic Concrete Sealant after the excess powder release has been washed off and the surface allowed to dry. Sealant shall not be applied prior to a minimum of ten (10) days curing. Concrete must be completely dry prior to sealing. Product distributed by Form & Build Supply (1-800-563-2285) or approved equivalent.
- .3 All concrete to be sealed must be pressure washed and buffed to ensure a clean surface to allow proper penetration of Sealant. The Consultant shall be present at the commencement of washing to confirm the finished colour against the approved sample.

**3.6 Warranty**

- .1 The Contractor shall warrant the materials and workmanship for Twenty-four (24) months standard warranty to apply from Substantial Performance Certification. Refer to Section [01700](#) – **Contract Closeout, Takeover & Warranties** for submittal requirements.

**End of Section - 03311**