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| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | November 5, 2007 | Minor revisions by Legal Services. |
| 3 | November 13, 2009 | Modified ‘Related Section’ |
| 4 | March 15, 2011 | Minor changes from Legal |
| 5 | June 5, 2012 | Added References and Replacement Parts Sections |
| 6 | July 3, 2012 | Reformatted to Remove White Space |
| 7 | April 24, 2015 | General Formatting |
| 8 | August 18, 2015 | First draft review of updated specs (AV) |
| **9** | **September 16, 2015** | **Updated, Finalized Specification – Reference eDOCS #5823150-v3 (AV)** |
| 10 | June 14, 2018 | 2.1 Removed all named manufacturers, replaced with performance specifications  2.1.8.1 Section added  3.6.2 Section added  (BM) |

# GEneral

## Related Sections

#### Section 01300 – Submittals

#### Section 03100 – Concrete Forms and Accessories

#### Section 03300 – Cast in Place Concrete

#### Section 09900 – Painting and Protective Coatings

## Measurement and Payment

.1 All costs associated with the work of this Section shall be included in the price(s) for Item No(s). \_\_\_ in the Bid Form.

## References

### American Society for Testing and Materials (ASTM):

#### ASTM C109/C109M-21, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50 mm Cube Specimens)

#### ASTM C309-19, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

#### ASTM C920-18, Standard Specification for Elastomeric Joint Sealants.

#### ASTM C779/C779M-19, Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces

#### ASTM C1315-19, Standard Specification for Liquid Membrane-Forming Compound Having Special Properties for Curing and Sealing Concrete.

#### ASTM D3363-20, Standard Test Method for Film Hardness by Pencil Test

#### ASTM E430-19, Standard Test Methods for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry

### Canadian General Standards Board (CGSB)

#### CGSB 51-GP-51M, Polyethylene Sheet for Use in Building Construction

### Canadian Standards Association (CSA)

#### CSA A23.1-19, Concrete Materials and Methods of Concrete Construction

### Society for Protective Coatings (SSPC),

#### SSPC-SP 13/NACE No. 6 Surface Preparation of Concrete

### American Concrete Institute (ACI)

#### ACI 308R-16 Guide to Curing Concrete.

#### ACI 301-16 Specifications for Structural Concrete

### American National Standards Institute

#### ANSI/NFSI B101.1-2020, Test Method for Measuring Wet SCOF of Common Hard-Surface Floor Materials

## Submittals

### Product Data Sheets

#### Submit three copies of the manufacturer's Product data sheets and Material Safety Data Sheets (MSDS) including installation, application, and maintenance instructions for:

##### Curing compound

##### Surface sealer

##### Floor hardener (non-metallic)

##### Chemical hardener

##### Capillary waterproofing

##### Control joint sealant

##### Polyethylene sheet

### Shop Drawings

#### Submit shop drawings detailing finishes for floors and walls.

#### Curing methods proposed.

#### Manufacturers’ data and MSDS for the following products:

##### Evaporation retardant

##### Curing compound

##### Clear sealer

##### Clear floor hardener

## Quality Assurance

### Concrete finishers: Skilled personnel with a minimum of five years of proven satisfactory experience finishing concrete of comparable size and scope.

### Engage the manufacturers' representative for on Site supervision prior to, during, and after applications. Verify that the specified Products are correctly applied and the amounts and finishing procedures comply with the manufacturer's printed instructions for the Work.

### Mockups: Install one 3 m by 3 m area for each type of finish wall/floor to demonstrate that the material and methods produce a finished product acceptable to the Consultant.

#### Mockups will establish the standard of quality for finishes.

##### Use the specified materials at a location designated by the Consultant or the Region.

##### The Region’s and Consultant’s Site inspector/s to witness the procedure for each type of finish during actual execution of work.

##### Upon completion of work, the Consultant will perform inspection. Correct the deficiencies observed by the Consultant to meet the requirement under this section.

##### After agreement by the Consultant that work is done to a level of his satisfaction and the work is ready for inspection.

##### Provide a minimum of 5 Working Day notice to the Consultant’s engineer in advance of inspection.

##### Correct the deficiencies if any observed by the Consultant for all types of finishes.

##### Upon agreement, the Consultant will jointly provide written acceptance letter for each type of finish which is acceptable.

##### Mockups will establish the standard of quality for finishes (one for each finish) which are accepted in writing.

##### Provide specified surface finishes at locations as indicated in this in the Contract Drawings based on the approved mock ups.

### Colour Samples: Minimum 50 mm by 50 mm sample applications of floor finishes available.

## Delivery, Storage and Handling

### Prevent the deterioration or contamination of stored materials. Deteriorated or contaminated materials will be rejected and must be removed immediately from the Site immediately.

## Site Conditions

### Comply with any special requirements of Section 03300 - Cast in Place Concrete for any items of Work to be performed under cold weather and warm temperature conditions.

# PRODUCTS

## Materials

### Curing compound: ASTM C309-11

#### Type 2

### Combination curing and sealing compound conforming to ASTM C1315-11, clear, non-yellowing compound.

### Surface sealer: Clear, liquid surface hardener and dust proofer;

#### VOC Content: 0 mg/L

### Non-metallic floor hardener:

#### Premixed blend of mineral aggregates, wetting and densifying agents, and Portland cement, shake on type;

#### Minimum Moh's Hardness of 6.

#### Minimum compressive strength of 55 MPa at 28 days.

### Control joint sealant:

#### In accordance with ASTM C920 – 18.

### Polyethylene sheet: CGSB 51-GP-51M; 0.15 mm thick.

### Wet curing materials: Non-staining waterproof curing paper, burlap, or canvas coverings.

### Bonding agent: Suitable for the conditions of service and the performance requirements of this Section.

### Non-shrink, non-ferrous grout: Pre-blended hydraulic cement grout;

# EXECUTION

## Preparation

### Determine the requirements for any applied finishes.

## Tolerances

### Finish surfaces to the following tolerances in accordance with CSA A23.1-19, Clause 7.5.1.2 Straightedge Method.

#### Flat: Finish tolerance 5 mm in 3,000 mm. Surfaces to receive a vinyl tile, epoxy floor finish or other thin applied floor finish; surfaces to receive ceramic tile or quarry tile on a thin set bond coatand exposed surfaces of concrete floors.

## Concrete Finishing

### General

#### Concrete finishing effort is directly dependent on forming, concrete placing, and curing techniques. Perform finishing procedures until the specified finishes are achieved.

#### Complete concrete finishing in areas where mechanical and electrical equipment will be installed prior to the commencement of any such installations.

### Slab or Floor Surfaces

#### General

##### Carry out finishing operations in accordance with CSA A23.1-19, Clause 7.5 – Finishing and Treatment of Slab or Floor Surfaces.

##### Initial finishing operations shall consist of placing, consolidating, and screeding, immediately followed by straightedge, bull floating, or darbying. Complete all levelling and consolidation before free moisture or bleed water rises to the top of the surface.

##### Provide at least one standby power trowel. Provide sufficient finishers and equipment for the Work.

##### Take all precautions necessary in order to protect the finish against inclement weather.

##### Commence final finishing operations, consisting of floating and trowelling, when the concrete has stiffened sufficiently to prevent the working of excess mortar to the surface and is able to sustain foot pressure, and after removing any free bleed water.

##### Re-straighten with a straightedge as often as necessary in order to achieve the specified floor tolerances.

#### Float Finish Type S-1

##### After initial finishing, provide a float finish in accordance with CSA A23.1-19, Clause 7.5.4.2 Floating.

#### Trowel Finish Type S-2

##### After initial finishing and floating, trowel the surface with a steel hand or power trowel in accordance with CSA A23.1-19, Clause 7.5.4.3.2. Trowel, keeping the blade flat at first and raising the blade angle a little more on subsequent passes. Leave the surface smooth, dense, of fine uniform texture without a swirl and free of blemishes.

#### Type S-5 (Underside Elevated Slab Finish):

##### When forming is removed, grind off projections on the underside of the slab and patch any defective areas, including small shallow air pockets, where required by the schedule of concrete finishes listed in subsection 3.10:

##### The preparation of surfaces for painting shall be as specified in Section 09900 – Painting and Protective Coatings.

#### Surface Sealer

##### Treat all surfaces which are subject to traffic in the finished structure, such as slabs, stairs, landings, walkways, and similar locations, with a surface sealer except if the surfaces have been cured with a dual purpose curing and sealing compound.

##### Apply the sealer in accordance with the manufacturer's printed instructions.

##### Do not use a surface sealer where bonded finishes or waterproofing is scheduled.

### Formed Surfaces

#### General

##### Provide a smooth form finish in accordance with CSA A23.1-19, Clause 7.7.3.6 - Smooth Form Finish unless noted otherwise in the Contract Documents.

##### Remove the face formwork as soon as practical in order to facilitate the repair of any surface defects. Surface defects include but are not limited to formwork tie holes, bugholes with a nominal diameter or depth greater than 6 mm, honeycomb and defective concrete, fins, projections, irregularities, offsets, spalled corners, and other defects.

##### Avoid damaging corners and keep edges sharp.

#### Formwork Tie Holes

##### Cut formwork ties 25 mm from the surface of the concrete.

##### Make edges of depressions sharp.

##### Fill depressions with pre-blended, non-shrink, non-ferrous grout of the same colour as the concrete for any exposed concrete surfaces.

#### Irregularities

##### Grind smooth fins, projections, irregularities, and offsets, including those at visible construction joints.

##### Where irregularities and offsets cannot be remedied by grinding, chip the concrete surface sufficiently deep and apply thoroughly bonded pre-blended, non-shrink, non-ferrous grout in a method similar to the repair of honeycomb and defective concrete.

#### Surface Depressions

##### Fill bugholes, and other surface depressions with a sand cement mortar to match the surface of surrounding concrete.

#### Spalled Corners

##### Use repair materials of a similar appearance and strength as the surrounding concrete to reconstruct the corner to match the adjacent corners.

#### Honeycomb and Defective Concrete

##### Do not repair honeycomb and defective concrete until it has been reviewed by the Consultant and permission has been granted to proceed with the repair work.

##### Remove honeycomb and defective concrete down to sound concrete with the edges slightly undercut or perpendicular to the surface. Remove to a minimum depth of 25 mm. No feather edges are permitted.

##### Pre-dampen the patch area.

##### Use pre-blended, non-shrink, non-ferrous grout of the same colour as the concrete for any exposed concrete surfaces.

##### Use bonding agents in patching work.

##### Patch surfaces slightly higher than the surrounding concrete.

##### Wet cure patches to the equivalent of 10 Days minimum.

##### When the patched surface has hardened, rub the surface with carborundum brick to form a true surface, free from streaks, discolourations, and other imperfections to match flush with the surrounding concrete.

#### Smooth rubbed finish Type W-5

##### Do not commence rubbing or grinding operations until all surface defects are repaired and all patching materials have hardened.

##### Dress surfaces by rubbing or grinding with bricks of carborundum, emery, or other abrasive material to a smooth and even surface to the best grade of architectural concrete work. Wet and rub surfaces until surfaces are even and of a uniform smooth appearance. Prevent rounding edges, obliterating the bevel lines on edges and corners, and chipping or cracking the finished edges.

#### Sack rubbed Finish Type W-6

##### After completion of the surface preparation of the smooth rubbed finish, apply a sack rubbed cement finish to form a smooth finish of uniform appearance as specified in CSA A23.1-19, Clause 7.7.3.7.4 Sack Rubbed Finish. Apply a second coat of sack rubbed cement finish to produce a smooth uniform appearance if required in order to obtain acceptance. Demonstrate on a sample panel prior to production finishing.

##### Upon completion, thoroughly wash the surfaces with clean water

#### Related Unformed Surfaces

##### Screed and float tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring in units cast in forms to a texture consistent with that specified for the formed surface unless some different finish is specified elsewhere in the Contract Documents.

## Curing Concrete

### Begin curing immediately following placing and finishing in accordance with CSA A23.1-19 Clause 7.4 except as noted below .The rate of evaporation is dependant on the relative humidity, concrete temperature and wind velocity. For the rate of evaporation of moisture from a concrete surface covered with water, see CSA A23.1-19 Appendix D Guidelines for curing and protection .

### Wet cure for 10 consecutive Days at a minimum temperature of 10°Celsius. This requirement supersedes the requirements of Table 20 Allowable Curing Regimes of CSA23.1-19 *.*

### Establish the requirements of the specified finishes for concrete surfaces before applying the curing compound. Verify that the curing compound is compatible with the applied finishes.

### Do not use curing compounds on surfaces:

#### Where bonded concrete topping will be applied.

#### Where high temperature control requirements are in force.

#### For potable water structures.

### Formed Surfaces (Walls and Columns)

#### Wet cure as specified by pouring water between the formwork and the concrete surface, where possible.

#### As an alternative, cure as specified above until the formwork is removed. Immediately after removal of the formwork, provide 24 hours saturation followed by the application of a curing compound in accordance with the manufacturer's printed instructions.

### Unformed Surfaces (Slabs)

#### Cover with absorbent material kept continuously saturated as soon as the cement will not wash out or the finish will be damaged.

#### As an alternative, wet cure for 24 hours then seal with two complete coats of curing compound applied in accordance with the manufacturer's instructions. Maintain the coating during the curing period.

### Bonded Concrete Toppings

#### Wet cure for 10 consecutive Days if no bonding agent has been used.

#### If a bonding agent has been used, employ curing methods for the concrete topping which will produce a cure equivalent to 10 Days wet curing and which is in accordance with the bonding agent manufacturer's printed instructions.

#### Protect and prevent damage to concrete topping floor finishes. Repair any damaged sections.

#### Protect the topping from freezing for a minimum of 14 Days after placing.

## Protection

### Keep traffic which would affect or disturb the curing procedures off of the finished surfaces for a minimum period of 7 Days.

### Protect all exposed concrete finishes against damage until acceptance of the Work by the [Region]. Do not allow rain, sleet, or snow to increase mixing water or to damage the surface finish.

### Protect floors which are to receive architectural finishes against contamination by oil, paint, or other deleterious materials which may affect the finish.

### Protect any items set into floors from damage. Verify that the alignment is not disturbed.

## Tests and Inspection

### Vapour Transmission Test: Conduct tests on new and existing concrete to show that no surface moisture exists prior to application of the specified special floor treatment, as follows:

#### Place a polyethylene plastic sheet, a minimum of 1.2 m by 1.2 m in size, and sealed along four sides with duct tape to prevent moisture transmission by evaporation, over the concrete floor area for 24 hours.

#### An indication of moisture transmission will be apparent by the accumulation of moisture on the enclosed surface of polyethylene plastic sheet.

#### Do not apply a concrete bonding agent until the test results indicate that moisture is not being transmitted from the concrete surface.

### Abrasive Aggregate:

#### For slip resistant abrasive aggregate: ASTM C779/C779M-12.

#### Surface Traction: ANSI/NFSI B101.1-2009

#### Degree of Reflectiveness: ASTM E430-11

#### Degree of Hardness: ASTM D3363-05

## Manufacturer’s Services

### Provide the services of a manufacturer's representative at the Site for installation assistance, inspection and certification of proper installation, and the training of application personnel.

#### The manufacturer’s representative shall provide technical assistance to ensure and certify the application and installation of the system being used.

#### The manufacturer’s representative shall provide consultation, direction, and certification of the mockup, for full-scale application of floor finishes, and at other times as needed.

## Field Quality Control

### Measure the floor slab flatness and levelness, as applicable, in accordance CSA A23.1-19, Clause 7.5.1.2 Straightedge Method.

## Schedule of Finishes

### Concrete Slab Finishes

#### Type S 1 (Wood Float Finish):

##### Provide float finish for concrete surfaces which are to receive traffic toppings, backfill, and crystalline waterproofing slurry coat

#### Type S 2 (Steel Troweled Finish):

##### Provide trowel finish for concrete surfaces which are to receive special flooring, chemical resistant coating, resilient flooring, ceramic tiles on thin set mortar, carpet, roofing and waterproofing membranes, and for exposed concrete floors, mechanical and electrical bases, and bonded concrete toppings, unless specified otherwise in the Contract Documents.

##### Do not use dry cement or additional water during trowelling. Excessive trowelling will not be permitted.

##### Do not use a power machine when the concrete has not attained the necessary set to allow finishing without introducing high and low spots in the slab.

##### The Contractor shall first perform steel trowelling for a Type S 2 finish by hand.

#### Type S 5 (Underside Elevated Slab Finish):

##### When forming is removed, grind off projections on the underside of the slab and patch any defective areas, including small shallow air pockets, where the schedule of concrete finishes requires:

###### The preparation of surfaces for painting as specified in Section 09900 - Painting and Protective Coatings.

#### Concrete Curbs:

##### Float top the surface of the curb smooth, and finish all discontinuous edges with a steel edger.

##### After the concrete has taken its initial set, remove the front form and give the exposed vertical surface an ordinary wall finish, Type W 1.

### Concrete Wall Finishes

#### Type W 1 (Ordinary Wall Finish):

##### Patch tie holes.

##### Knock off projections.

##### Patch defective areas.

#### Type W 2 (Smooth Wall Finish):

##### Patch tie holes.

##### Grind off projections, fins, and rough spots.

##### Patch defective areas and repair rough spots resulting from the form release agent’s failure or any other reason, in order to provide a smooth uniform appearance.

#### Type W 4 (Finish for Painting):

##### Patch tie holes.

##### Grind off projections, fins, and rough spots.

##### Patch and repair defective areas as specified for Type W 2.

##### Concrete Surface Preparation:

1. Do not begin until a minimum of 30 Days after the concrete has been placed.

2. Meet the requirements of SSPC-SP 13/NACE No.6.

3. Remove all grease, oil, dirt, salts or other chemicals, loose materials, or other foreign matter by solvent, detergent, or any other suitable cleaning methods.

4. Brush-off, blast clean and remove any loose concrete and laitance, and provide a tooth for binding. Upon approval by the Consultant, the surface may be cleaned by an acid etching method. This approval is subject to producing a desired profile equivalent to No. 80 grit flint sandpaper. Acid etching of vertical or overhead surfaces shall not be allowed.

5. Obtain and comply with the coating manufacturer’s recommendations for any additional preparation, if required, for excessive bug holes exposed after blasting.

6. Unless otherwise required for proper adhesion, ensure that all surfaces are dry prior to painting.

#### Type W 6 (Sack Rubbed Wall Finish):

##### Unless otherwise specified in the Contract Documents, provide a sack rubbed finish on any concrete surfaces exposed to view including:

1. Interior surfaces in dry areas including walls, soffits, pipe supports, and equipment bases.

2. Exterior surfaces above the finished ground level.

### Beam and Column Finishes:

#### To match the wall finish.

## Schedule of Concrete Finishes

### Provide concrete finishes as scheduled below:

| Area | Type of Finish |
| --- | --- |
| Above grade/exposed (above a point 150 mm below the finish grade) | W‑6 |
| Above grade/covered with brick veneer or other finish material | W‑1 |
| Backfilled/waterproofed (below a point 150 mm below the finish grade) | W‑1 |
| Backfilled/not waterproofed (below a point 150 mm below the final grade) | W‑1 |
| Walls which are to receive paint | W-4 |
| Buildings, pipe galleries, and other dry areas/not painted or coated | W‑6 |
| Buildings, pipe galleries, and other dry areas/painted or coated | W‑4 |
|  | Special finishes |
| Stairs and landings | S‑2 |
| Other exterior slabs | S‑1 |
| Buildings, pipe galleries, and other dry areas | S‑2 |
| Underside of elevated slabs | S‑5 |

**END OF SECTION**