SECTION 03 35 00 – concrete finishing

1. General
   1. SUMMARY

SPEC NOTE: Edit the following list below to reflect project requirements. Delete items not required on the project.

SPEC NOTE: Edits made below need to be followed in part 2 below.

SPEC NOTE: **Do not** specify concrete densifier or sealer in areas scheduled to receive finish flooring. Sealers and densifiers will stop finish flooring primers or adhesives from adhering to the substrate.

* + 1. Work of this Section includes the supply and installation of the following concrete floor treatments, as well as testing and measurement for floor flatness and levelness.
       1. Requirements for concrete floor additives such as:
          1. Liquid-Applied Penetrating Sealer.

SPEC NOTE: Use the following paragraph when existing concrete floors are required to be densified to allow for heavy wheeled traffic and/or when heavy-duty room requirements are identified.

**EX. Garbage rooms, loading docks, warehouses / storage areas.**

* + - * 1. Liquid-Applied Concrete Densifier.
      1. Testing and measurement for floor flatness and levelness,
      2. Trowelling, levelling, and floating of floor surfaces for ready for applied finishes.
  1. WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS
     1. Supply dock leveller boxes to Division 3 Concrete Specifications, provided by Structural, for casting into concrete.
  2. DEFINITIONS
     1. Floor Classifications: Classification of concrete floor slabs based on their intended use, methods of finishing and finish materials applied to flooring as denoted by the F‑rating below, and as follows:
        1. Single Course Floor: Floors placed in a single course with final finishing applied to properly levelled concrete.
     2. Finish or Finishes: Materials applied to finished concrete surface, i.e.: stained or coloured concrete, carpet, resilient flooring, or ceramic tile.
     3. Finishing: Methods, tools, and equipment employed to achieve levelness or surface flatness for shored slabs and slabs‑on‑grade, and durability indicated and as follows:

SPEC NOTE: Select one of the following finishes from the list below.

F-1 FINISH – PARKADE  
 F-2 FINISH – LIGHT DUTY INDUSTRIAL FLOORS  
 **F-3 FINISH – COMMERCIAL FLOORS & INDUSTRIAL FLOORS**  
 F-4 FINISH – HEAVY DUTY INDUSTRIAL FLOORS & SUPER FLAT FLOORS

* + - 1. F1‑Finishing: Floors having a straightedge value of ±5/16” over 10’; similar to CSA A23.1 Class A Slab Finishing.
      2. F2‑Finishing: Floors having a straightedge value of ±1/4” over 10’; similar to CSA A23.1 Class B Slab Finishing.

SPEC NOTE: F3 finish is most common and is the primary selection when not identified otherwise.

* + - 1. F3‑Finishing: Floors having a straightedge value of ±1.6mm over 3048mm (1/6” over 10’); similar to CSA A23.1 Class C Slab Finishing.
      2. F4‑Finishing: Floors having a straightedge value of ±1/8” over 10’; similar to CSA A23.1 Class D Slab Finishing.
  1. REFERENCE STANDARDS
     1. American Society for Testing and Materials (ASTM):
        1. ASTM C309, Standard Specification for Liquid Membrane-Forming Compound for Curing Concrete.
        2. ASTM C979/C979M-10, Standard Specification for Pigments for Integrally Colored Concrete.
     2. American Concrete Institute (ACI):
        1. ACI 117‑2010, Specifications for Tolerances for Concrete Construction and Materials and Commentary
        2. ACI 302.1R‑15, Guide for Floor and Slab Construction
     3. Canadian Standards Association (CSA):
        1. CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
     4. International Concrete Repair Institute (ICRI):
        1. ICRI 310.2R-2013, Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays and Concrete Repair
  2. ADMINISTRATION REQUIREMENTS
     1. Coordination:
        1. Coordinate a meeting between the Contractor, Subcontractor responsible for concrete placement, and the Consultant to determine site quality control testing section borders and sample measurement line locations, method of measurement, and accuracy requirements of the measuring devices.
     2. Pre‑Construction Meetings:
        1. Arrange meeting with Contractor, Subcontractor for work of this Section and other Subcontractors affected by work of this Section to discuss effects and issues governing installation of concrete finishing materials.
        2. Prepare an outline agenda for meeting in accordance with Section 01 31 19 – Project Meetings.
  3. SUBMITTALS
     1. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
     2. Action Submittals: Provide the following submittals before starting any work of this Section:
        1. Product Data: Submit manufacturer’s product data for each materials specified including recommended application rates and methods of installation.
     3. Informational Submittals: Provide the following submittals during the course of the work:
        1. Site Quality Control Submittals: Submit results for straightedge measurements to demonstrate compliance with specified tolerances. Record the following information on a drawing indicating floor slab layout, column locations and slab penetrations:
           1. Indicate variance from specified straightedge measurements as a + or ‑ value.
           2. Failed tests in excess of 50% of the straightedge will require the Subcontractor to flash patch floor to achieve specified tolerance, example of tolerance failure.
           3. Slabs‑On‑Grade: Measurement of 1.6mm (1/16”) or greater than ±6mm (1/4”) measurement will be considered as a failed test and will require flash patching.
           4. Suspended Slabs: Measurement of 3mm (1/8”) or greater than ±6mm (¼”) measurement (80% tolerance allowance) will be considered as a failed test and will require flash patching.
  4. PROJECT CLOSEOUT SUBMISSIONS
     1. Operation and Maintenance Data:
        1. Submit detailed cleaning and maintenance instructions for concrete densifier products and instruct Owner in proper care and maintenance of specified floor finishes, including a complete list of floor care products that will be required for ongoing maintenance, in accordance with Section 01 33 00 – Submittal Procedures.
  5. QUALITY ASSURANCE
     1. Subcontractor executing work of this Section shall employ installers having a minimum of five (5) years continuous experience in successful installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.
     2. Ensure proper use of proprietary materials in strict accordance with the material manufacturer's directions.
  6. SITE CONDITIONS
     1. Environmental Requirements:
        1. Ensure that adequate temporary heating is provided as required for cold weather work.
        2. Provide adequate moisture, sunshades, and wind barriers to prevent too rapid drying of concrete during hot weather.
     2. Protection:
        1. Ensure that finished concrete floor areas are protected from abrasion from foot or wheeled traffic, and from damage caused by spillage of oil or other harmful materials.

1. Products
   1. MATERIALS
      1. Liquid-Applied Penetrating Sealer:
         1. Clear water-based silane micro emulsion penetrating concrete sealer, formulated to prevent water and chloride intrusion into concrete surfaces.
            1. Basis of Design Materials:

Planiseal WR 40 by Mapei Inc.

Cipadm S-40 by CPD Construction Products

Sikagard SN40 by Sika Canada Inc.

Hydrozo Silane 40 VOC by BASF.

SPEC NOTE: Use the following on renovation projects, or when submitting this section with the interior specification package.

* + 1. Liquid-Applied Concrete Densifier:
       1. One-component, liquid sodium silicate surface densifier for application on existing concrete, reducing porosity of concrete surfaces.
       2. Colourless, and odourless.
          1. Basis of Design Materials: Sikafloor S3 by Sika Canada Inc.

SPEC NOTE: Specify underlayment to level floors that will be covered with flooring materials as part of this contract.

* + 1. Underlayment:
       1. Concrete Substructure: Cementitious, self levelling, single component, polymer modified underlayment and manufacturer’s recommended primer, for application thicknesses to a minimum feather edge to 13mm (½”); acceptable.
          1. Basis of Design Materials:

Novoplan 2 plus by MAPEI Inc.

Sikafloor Level 125 by Sika Canada Ltd.

Sure-Flo ST by W.R. Meadows of Canada

SPEC NOTE: Specify overlayment to level floors that will be used as the primary exposed surface, or are not covered by flooring materials under this contract.

* + 1. Overlayment:
       1. Cementitious, self levelling, single component, polymer modified overlayment, for application thicknesses to a minimum of 13mm to 25mm (½” to 1”).
       2. Basis of Design Materials:
          1. Sikafloor Level 25CA by Sika Canada Ltd.
          2. Ultratop by Mapei Canada Inc.
          3. Sure-Flo FT 100 by W.R. Meadows of Canada

SPEC NOTE: Specify toppings to level floors that require levelling in excess of 1” to 2” and will be used as the primary exposed surface or are not covered by flooring materials under this contract.

* + 1. Topping:
       1. Cementitious, self levelling, single component, polymer modified overlayment, for application thicknesses to a minimum of 19mm to 50mm (¾” to 2”).
       2. Basis of Design Materials:
          1. Sikafloor Level 25CA by Sika Canada Ltd.
          2. Ultratop by Mapei Canada Inc.
          3. Gem-Crete TO by W.R. Meadows of Canada

SPEC NOTE: Specify patching materials to fill in depressions in floor slabs 1” or less. Specify underlayment or overlayment for large area levelling. Only include in specification if the pm indicates that the current slab is in good condition and requires minimal patching.

* + 1. Patching and Flash Patching Materials:
       1. Cementitious based, polymer modified, fine aggregate, single component, rapid curing, early strength floor patching compounds having high adhesion, for application in thicknesses to a minimum of 1/8” to 1”.
       2. Basis of Design Materials:
          1. SikaQuick 1000 by Sika Canada Ltd.
          2. Planitop 18ES by MAPEI Canada Inc.
          3. Meadow‑Crete H by W.R. Meadows of Canada
    2. Joint Sealant: Refer to Section 07 92 00 – Joint Sealants.

1. EXECUTION
   1. EXAMINATION
      1. Before commencing work, ensure that surfaces are acceptable to receive and maintain concrete finishing, and that specified installation will be achieved.
   2. FINISHING FLOORS AND SLABS
      1. Finish floors and slabs in accordance with CSA A23.1 and ACI 302.1R recommendations for screeding, re‑straightening, and finishing operations for concrete surfaces; do not wet concrete surfaces.
   3. INSTALLATION
      1. Installation - Liquid-Applied Penetrating Sealer:
         1. Vertical Surfaces:
            1. Apply using a brush, roller, or low-pressure spray, working from top to bottom by maintaining a 305mm (12”) parallel curtain (run down).
            2. When applying the material on a vertical surface, avoid accumulation and run-off of the material. In the event of material accumulation or run-off lines being formed, redistribute the material on the surface or remove by sponging.
            3. Apply flood coat in two (2) passes, “wet on wet” with the second pass at right angles to the first. Material coverage should not be greater than 2.5 m2/L total (100 ft2/US gal.), unless otherwise recommended by the Manufacturer.
         2. Horizontal Surfaces:
            1. Apply using a roller or low-pressure spray, ensuring that product penetrates the substrate and does not “pond” or “puddle” on the surface.
            2. If ponding occurs, redistribute, or remove the excess material on the surface before material starts to dry and form a film that will prevent penetration of excess material.
            3. Material coverage should not be greater than 4.4 m2/L (180 ft2/US gal.), unless otherwise recommended by the Manufacturer.
            4. Apply flood coat in two (2) passes, “wet on wet” with the second pass at right angles to the first.
            5. Complete and correct coverage of surfaces is crucial to the success of such sealers.
         3. Control Joints:
            1. Install bond breaker of silica sand, polyethylene film strip or foam filler in bottom of joints.
      2. Installation - Liquid-Applied Concrete Densifier :
         1. Stir well prior to use, ensuring thorough agitation and distribution of any settled material throughout the liquid. Where necessary, use a paint straining mesh or fabric to collect any material which has formed a surface skin.
         2. Apply directly from container, one undiluted uniform coat at the rate of 4 - 6 m2/L (163 - 244 ft2/US gal.), depending on porosity of concrete. To ensure maximum penetration, scrub material into the surface with a stiff-bristle broom or janitorial floor-scrubbing machine within thirty (30) minutes of initial application and before the product begins to gel or become slippery.
         3. Once the product begins to gel, wet material lightly with a water spray and rework it into the surface. Rinse the floor and remove any excess material with a squeegee and wet vacuum.
         4. On porous, rough-textured, or broom-finished surfaces, apply a second application, installed two - four (2 – 4) hours following the first application to insure maximum densification and positive protection from contaminant penetration.
         5. Floors are available for occupancy and traffic after four – six (4 – 6) hours from removal of excessive residue.
      3. Cementitious Levelling Treatments and Cementitious Topping, Patching and Flash Patching Materials:
         1. Leak Prevention:
            1. Fill cracks and voids in subfloor where leakage of slurry could occur using suitable quick setting patch material or caulk, as recommended by underlayment manufacturer.
         2. Prime substrate according to manufacturer’s recommendations.
         3. Installation shall not begin until building is enclosed and ventilated.
         4. Mix levelling treatments and cementitious topping, patching and flash patching materials in accordance with Manufacturer’s written instructions.
         5. Pour levelling treatments and cementitious topping, patching and flash patching materials to recommended thickness and immediately spread and screen to desired surface finish and level.
      4. Control Joints:
         1. Follow existing control joints in concrete levelling and topping finishes to prevent cracking. When concrete levelling and topping finishes are firm enough not to be torn or damaged by cutting, cut 5mm (3/16") wide control joints into surface of concrete with abrasive blade power saw.
         2. Once levelling and topping finishes are cured, fill control joints with joint sealant.
            1. Completely clean side joint surfaces of dirt, oil, grease, and similar contaminants, and mask floor surfaces at joints while installing joint sealant.
            2. Prime side joint surfaces with compatible primer if surfaces are not completely dry.
   4. PATCHING AND REFINISHING
      1. Before completion of project, patch and refinish defective surfaces to match surrounding areas with no discernible variation in appearance.

END OF SECTION