

SECTION 03 35 00
CONCRETE FINISHING

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Perform all work required to complete the Concrete Finishing indicated by the Contract Documents and furnish all supplementary items necessary for its proper execution.
- B. Alternate bids: Refer to other sections for description.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 specification sections, apply to work of this section.

1.3 CODES AND STANDARDS

- A. Work described in this Section, unless otherwise noted on the Drawings, or herein specified, shall be governed by the latest editions of the following codes or specifications.
 - 1. ACI 301, "Specifications for Structural Concrete for Buildings".
 - 2. ACI 302, "Guide for Concrete Floor and Slab Construction".
 - 3. ACI 305, "Hot Weather Concreting".
 - 4. ACI 306, "Cold Weather Concreting".
 - 5. ACI 311, "ACI Manual of Concrete Inspection".
 - 6. ACI 318, "Building Code Requirements for Reinforced Concrete".
 - 7. ASTM C309, Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete.
 - 8. ASTM E1155, "Test Method for Determining Floor Flatness and Levelness using the F-Number System".

1.4 PROJECT DATA

- A. Submit copies of manufacturer's literature for all products.

1.5 FINISHING TOLERANCES

- A. Scratch Finish: After placing concrete, finish surface to tolerances of specified overall value of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) when measured according to ASTM E 1155, with minimum local value of F(F) 13 and F(L) 10.
- B. Float Finish: Finish surfaces to tolerances of specified overall value of F(F) 20 (floor flatness) and F(L) 15 (floor levelness) when measured according to ASTM E 1155, with minimum local value of F(F) 15 and F(L) 10.
- C. Trowel Finish: Finish surfaces to following F(F) and F(L) tolerances when measured according to ASTM E 1155:
 - 1. Floor levelness does not apply to slabs placed on unsupported form surfaces and to inclined slabs.
 - 2. Slabs-on-Grade:
 - a. Specified Overall Value: F(F)-25/F(L)-20
 - b. Minimum Local Value: F(F)-17/F(L)-15
 - 3. Elevated Cast-in-Place Concrete Framing System:
 - a. Level and Shored until after testing:
 - i. Specified Overall Value: F(F)-25/F(L)-20
 - ii. Minimum Local Value: F(F)-17/F(L)-15
 - b. Unshored:
 - i. Specified Overall Value: F(F)-25/F(L)-N/A
 - ii. Minimum Local Value: F(F)-17/F(L)-N/A

1.6 FLOOR TOLERANCE MEASUREMENTS

- A. Where normal data collection under provisions of ASTM E 1155 indicates possibility of work below minimum local value, additional data may be required to confirm extent, or boundary, of that defective work at Contractor's expense. If area is identified as not meeting specified minimum local value, area in question shall be replaced or repaired in accordance with provisions of Remedy For Out-Of-Tolerance Floor Surfaces Article, along minimum local area boundaries.

B. Floor Elevation Tolerances:

1. When tested in accordance with requirements of ASTM E 1135, following percentages of elevation samples on floor slabs at single elevation shall fall within level $\frac{3}{4}$ inch envelope centered about mean elevation of readings.
 - a. Slabs-on-Grade: 85 percent.
 - b. Elevated Slab: 80 percent.
2. Arithmetic mean of these elevation samples shall not deviate from design grade more than following amounts:
 - a. Slabs-on-Grade: $\frac{1}{4}$ inch, plus or minus.
 - b. Elevated Slabs: $\frac{1}{2}$ inch, plus or minus.

- C. Contractor shall take immediate action to correct work that does not meet specified tolerances.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Curing Compound/Sealer: ASTM C309, Type 1, Class B, 18 to 22 percent solids, clear Acrylic curing/sealing compound:
1. WR Meadows - "Vocomp-20" or "1100-CLEAR"
 2. L&M Construction Chemicals - "Dress & Seal WB"
 3. Sonneborn - "Kure-N-Seal W"
 4. Concrete Chemical Company – Ashford Formula
- B. Liquid Hardener: Curing, hardening and dust-proofing compound:
1. L&M Construction Chemicals - "Chem Hard".
 2. Sonneborn - "Sonosil".

PART 3 - EXECUTION

3.1 FORMED SURFACES

- A. As-Cast Rough Form Finish: Rough or board form finish surfaces shall be reasonable true to line and plane with no specific requirements for selected facing materials. Defects shall be patched and fins exceeding $\frac{1}{4}$ " in height shall be

rubbed down with wooden blocks. Otherwise, surfaces shall be left with the texture imparted by the forms.

- B. As-Cast Smooth Form Finish: Form facing materials shall produce a smooth, hard, uniform texture on the concrete. It may be plywood, tempered concrete-form-grade hardboard, metal, plastic, paper or other material capable of producing the desired finish. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to a practical minimum. It shall be supported by studs or other backing capable of preventing excessive deflection. Material with raised grain, torn surfaces, worn edges, patches, dents or other defects which will impair the texture of the concrete surface shall not be used. Tie holes and defects shall be patched. All fins shall be completely removed.

3.2 REPAIR OF DEFECTIVE AREAS

- A. All honeycombed and other defective concrete shall be removed down to sound concrete. If chipping is necessary the edges shall be perpendicular to the surface or slightly undercut. No feather edges will be permitted.
- B. The area to be patched and an area at least 6 inches wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. A bonding grout shall be prepared, using a mix of approximately one part cement to one part fine sand passing a No. 30 mesh sieve, mixed to the consistency of thick cream, and then well brushed into the surface.
- C. The patching mixture shall be made of the same materials and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than one part cement to 2 1/2 parts sand by damp loose volume.
- D. White Portland Cement shall be substituted for a part of the gray Portland Cement on exposed concrete in order to produce a color matching the color of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling and placing.
- E. The patching mortar shall be mixed in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.
- F. After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to lose the water sheen, the premixed patching mortar shall be applied. The mortar shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface.
- G. To permit initial shrinkage, it shall be left undisturbed for at least one hour before

being finally finished. The patched area shall be kept damp for 7 days. Metal tools shall not be used in finishing a patch in a formed wall which will be exposed.

3.3 SLAB SURFACES

A. Trowel Finish

1. The surface shall be finished first with impact power floats, then with power trowels, and finally with hand trowels. The first troweling after power floating shall be done by a power trowel and shall produce a smooth surface which is relatively free of defects but which may still contain some trowel marks.
2. Additional trowelings shall be done by hand after the surface has hardened sufficiently. The final troweling shall be done when a ringing sound is produced as the trowel is moved over the surface. The surface shall be thoroughly consolidated by the hand troweling operations.
3. The finished surface shall be free of any trowel marks and shall be uniform in texture and appearance and shall conform to the applicable finish, except tolerance for concrete on metal deck shall be Class B. On surfaces intended to support floor coverings, any defects of sufficient magnitude to show through the floor covering shall be removed by grinding.

B. Broom Finish: Immediately after float finishing, surface shall be given a course transverse scored texture by drawing a broom or burlap belt across the surface.

C. Dry Shake Finish

1. Surface shall first be given a float finish and then approximately two-thirds of the blended material for required coverage shall be applied to the surface by a method that insures even coverage without segregation. Floating shall begin immediately after application of the first "dry shake".
2. After material has been embedded by floating, the remainder of the blended material shall be applied to the surface at right angles to the previous application. The second application shall be heavier in any areas not sufficiently covered by the first application. A second floating shall follow immediately.
3. After the selected material has been embedded by the two floatings, the operation shall be completed with a broomed, floated or troweled finish, as specified.

- D. Nonslip Finish: Surface shall be given a "dry shake" application of crushed, ceramically bonded aluminum oxide abrasive particles at a rate of not less than 25 lbs. pr 100 sq. ft.
- E. Liquid Hardener: Apply a uniform coat of liquid hardener over finished slab in accordance with manufacturer's recommendations.

3.4 SCHEDULE OF FINISHES

- A. As-Cast Rough Form Finish: All concrete surfaces below grade.
- B. As-Cast Smooth Form Finish: All interior and exterior concrete surfaces exposed to view.
- C. Trowel Finish: Floor surfaces scheduled as exposed or to receive floor covering.
- D. Broom Finish: Exterior horizontal surfaces not scheduled for nonslip finish and interior surfaces scheduled to receive thin set tile.
- E. Dry Shake Finish: Surfaces scheduled to receive nonslip finish.
- F. Nonslip Finish: Exterior steps and ramps.
- G. Liquid Hardener: Exposed concrete floor in mechanical, electrical and service areas, or as scheduled in the room finish schedule as "Concrete with Hardener".

END OF SECTION