



## Suggested Specification for White Concrete Floors

### Specifier Notes:

1. The Architect or Engineer should review the contents and adopt the suggested language as appropriate, ensuring it meets project requirements and applicable building codes. Align section numbers and titles with other project specification sections.
2. It is highly recommended that Division 01 make clear that the concrete slab or portions of the slab will serve as the finished floor surface. It is important to require that the project be “dried in” prior to placing concrete that will serve as the finished floor. This suggested specification highlights locations within project specifications to require that the slab that will serve as the finished floor be protected during the construction process.
3. Specifiers are advised to take a systems approach to the concrete floor and call out any desired proprietary concrete treatments and carefully coordinate project specifications with recommendations of the proposed concrete surface treatment supplier. Surface treatment supplier to provide recommended requirements for finishing and curing to achieve the intended finish that may include post placement operations such as sealing, staining and/or polishing.

These recommendations generally follow the Construction Specifications Institute (CSI) Master Format.

### DIVISION 01 GENERAL REQUIREMENTS

#### SECTION 01 10 00 SUMMARY

##### 1.1 SUMMARY OF WORK

###### A. Work Covered By Contract Documents

1. The Work of Project: Include a description of the concrete slab, calling out locations where it will serve as the finished floor.

##### 1.2 MULTIPLE CONTRACT SUMMARY

###### A. Work Sequence

1. See DIVISION 03 00 00 CONCRETE regarding drying in building prior to construction of concrete slab to serve as finished floor.
2. Work above the concrete slab to serve as finished floor requiring mobile equipment shall be completed prior to placement of vapor barrier and Cast-in-Place Concrete.

## SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

### 1.1 TEMPORARY UTILITIES

#### A. All Temporary Utilities

1. Temporary utility equipment including but not limited to generators, compressors, lighting and water shall be positioned so they do not impact the slab to serve as the finished floor. When it is necessary to place equipment on the slab to serve as the finished floor, the slab surface shall be protected from discoloration, scratches, scuffs and stains.

### 1.2 TEMPORARY CONSTRUCTION

#### A. Temporary Decking

1. Work performed after the slab to serve as the finished floor has been placed shall utilize temporary decking and/or covering as required to protect floor slab from discoloration, scratches, scuffs and stains.

### 1.3 CONSTRUCTION AIDS

#### A. Scaffolding And Platforms

1. Scaffolding, ladders or other equipment for overhead access placed on the slab to serve as the finished floor must protect the slab from discoloration, scratches, scuffs and stains. The area around this equipment must be protected from materials falling onto the slab.
2. Tires for mobile work platforms must be non-staining and be free of screws and/or debris that can scratch, scuff or harm the slab surface. Use "belly tarps" on man-lifts to prevent hydraulic fluid drips and spills onto the slab.

### 1.4 VEHICULAR ACCESS AND PARKING

#### A. Temporary Access

1. Vehicular traffic, including forklifts and mobile hoists, is not permitted on the slab to serve as the finished floor.
2. Parking or staging of vehicles, including forklifts or other mobile equipment, is not permitted on the slab to serve as the finished floor.

#### B. Staging Areas

1. Temporary staging of materials on the slab to serve as the finished floor shall be placed on decking or other covering to protect the slab from scratches, scuffs and stains.
2. Reference TEMPORARY ACCESS section regarding staging of mobile equipment on the concrete slab serving as the finished floor.

The following language for Division 03 follows the Construction Specifications Institute (CSI) Page Format.

## DIVISION 03 CONCRETE

### SECTION 03 30 00 CAST-IN-PLACE CONCRETE WHITE FLOORS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Cast-In-Place concrete for exposed concrete white floors

##### 1.2 RELATED SECTIONS

- A. Section 03 30 00 Cast In Place Concrete
- B. Section 03 33 00 Architectural Concrete
- C. Section 03 35 00 Concrete Finishing

##### 1.3 REFERENCES

###### A. American Concrete Institute:

1. ACI 117 Specifications for Tolerances for Concrete Construction and Materials and Commentary
2. ACI 301 Standard Specification for Structural Concrete
3. ACI 302 Guide for Concrete Floor and Slab Construction
4. ACI 303 Standard Specification for Cast-In-Place Architectural Concrete
5. ACI 304 Guide for Measuring, Mixing, Transporting, and Placing Concrete
6. ACI 308 Standard Practice for Curing Concrete
7. ACI 310 Guide to Decorative Concrete

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

1. ASTM C33 Standard Specification for Concrete Aggregates
2. ASTM C94 Specification for Ready-Mixed Concrete
3. ASTM C150 Standard Specification for Portland Cement
4. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

5. ASTM C595 Standard Specification for Blended Hydraulic Cements
6. ASTM C989 Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars

#### 1.4 QUALITY ASSURANCE

- A. White Concrete: Concrete indicated as white concrete shall be produced in accordance with applicable requirements of ACI 301 and ACI 303.1
- B. Site Mock-Ups:
  1. Construct site mock-ups for all white concrete work and formed concrete that will be exposed to the public in the finished work, not less than 20 feet by 20 feet in surface area, for review by the Engineer and acceptance by the Architect, before starting the placement of concrete.
  2. Approved site mock-ups for all white concrete shall set the standard for the various white concrete features: flatness, levelness, formed finishes, and colors of the concrete. The materials and practices used to produce the mock-up panel, including placement, curing, surface treatment applications including polishing if specified shall be the same as proposed to produce the cast-in-place slab.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Portland Cement for use in the white concrete floor shall be Lehigh White Portland Cement conforming to the requirements of Standard Specification for Portland Cement; ASTM C 150, for Type I Portland cement, except that it shall contain not more than 0.50 % by weight Ferric Oxide ( $Fe_2O_3$ ).
- B. Blended Hydraulic Cement for use in the white concrete floor shall be Lehigh White PLC Cement conforming to the requirements of Standard Specification for Blended Hydraulic Cement, Type IL. It shall contain not more than 0.50 % by weight Ferric Oxide ( $Fe_2O_3$ ).
- C. Slag: Ground Granulated Blast Furnace Slag; Slag cement shall be white or very light in color and shall conform to the requirements of Standard Specification for Ground Granulated Blast-Furnace Slag for use in Concrete and Mortars; ASTM C-989, and be Grade 100 or Grade 120. If used, slag cement replacement may be up to 40 percent (by mass of cementitious materials) on floors that will not be densified with floor hardeners. Consult the recommendations of the densifier manufacturer regarding limits on SCM use when specifying materials for concrete mixtures. Many will limit SCM replacement, including slag cement, to 15 - 20 percent (by mass of cementitious materials).

- D. SMC materials not recommended for use include: Fly Ash, Silica Fume containing more than 2% elemental carbon, or any Supplementary Cementitious Materials that are dark in color or may discolor the concrete mixture.
- E. Aggregate: Both fine and coarse aggregates should meet the ASTM C 33 requirements for normal concrete aggregates and shall be white or very light in color.
  - 1. Fine aggregate for white concrete should be either white or light colored and consist of clean, hard, durable particles of silica sand, crushed white marble or white limestone entirely free from deleterious substances.
  - 2. Coarse aggregate for white concrete should consist of clean, hard, durable white or light-colored aggregate, free from deleterious substances.
- F. Mix Design: White concrete shall be Mix # \_\_\_\_ as supplied by \_\_\_\_\_ (Address, Phone, and Contact Name) or equal
- G. Curing materials for white concrete, including liquid curing compounds or coverings, shall be selected to be non-staining. The curing method selected must be tested for color impact on the surface of white concrete and be non-staining. If a polished finish is specified, the curing method shall comply with the requirements of Section 03 35 43 Part 3.01a, Polished Concrete Finishing.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Dried-in: Prior to placing white concrete for the concrete floor, the structure must be "dried in". The roof and walls must be substantially complete as to provide an environment protected from wind and precipitation.
- B. Subgrade: Prior to placement of concrete, the subgrade shall be in a firm, well-drained condition, and of adequate and uniform load-bearing nature to support construction personnel, construction materials, construction equipment, and steel reinforcing mats without tracking, rutting, heaving or settlement. All weak, soft, saturated, or otherwise unsuitable material shall be removed and replaced with structural backfill or controlled density fill.
- C. Overhead: Work that occurs above the suspended ceiling panels such as electrical, plumbing, gas, water, fire protection, painting and HVAC systems to be completed prior to placing the white concrete for the concrete floor.

### 3.2 TRANSPORTING

- A. White concrete for the concrete floor shall be transported to the Jobsite in a mixer, in accordance with the requirements of ASTM C94. Trucks shall be cleaned and segregated to prevent cross contamination from other mixes.

### 3.3 PLACEMENT

- A. In addition to the requirements of Section 03 35 00 Concrete Finishing, the following requirements shall apply:
1. Hand or machine troweling to follow floating of the slab surface. Troweling shall not be done when surface bleed water is present. The surface shall be brought to a smooth finish, free of defects and blemishes.
  2. Carefully monitor machine troweling operations to prevent discoloring the slab surface. The use of steel trowel blades is permitted during initial troweling operation. Subsequent machine troweling operations shall utilize plastic or combination finishing blades to prevent burn marks.
  3. Finishing operations shall comply with the recommendations from the floor surface treatment supplier.
  4. Items other than Formwork: Conform to ACI 117 except as specified.
  5. Slab on Grade and Pavement Base Fine Grade: Subgrade shall be to grade + 1/8 inch - 3/4 inch with transition no greater than 3/4 inch vertically to 8 inches horizontally for level slab.
  6. Slab on Grade and Pavement Thickness: as detailed in the Plans and as required conform to slab Finished Surface Flatness and Levelness tolerances +/- 1/4".
  7. Finished Surface Flatness and Levelness: If a polished finish is specified, white concrete floor slab shall achieve a Specific Overall Value (SOV)  $F_F50/F_L35$  and Minimum Local Value (MLV)  $F_F33/F_L24$  tolerance in accordance with ACI 117.
  8. Remedies for Out-of-Tolerance Work: Remove and replace slabs-on-grade measuring below either (or both) of specified minimum local F-numbers or as required by Owner. The cost of removal and replacement of concrete slab on grade shall be the responsibility of the contractor that placed the slab. The Owner may choose to mitigate concrete measuring below either (or both) of specified minimum local F-numbers by grinding the surface to achieve acceptable Surface Flatness and Levelness. Cost of grinding slab to achieve tolerances shall be the responsibility of the contractor that placed the slab.

### 3.4 CONSTRUCTION JOINTS

- A. Construction joint layout to be approved by the Engineer. Construction joints permitted per the approved joint layout plan and/or where otherwise indicated or approved by the Engineer.
- B. Provide and prepare construction joints in accordance with the applicable requirements of ACI 301 and ACI 304.
- C. Make construction joints straight and as inconspicuous as possible, and in exact vertical alignment with the structure.

### 3.5 CURING AND PROTECTION

- A. Curing of concrete shall conform to applicable requirements of ACI 301 and ACI 308.
- B. Contactor to provide no less than two spill treatment kits consisting of materials to neutralize and clean both water and oil based spills. Examples of materials to include in the kits are cleaning supplies such as multipurpose shop towels, soft bristle broom and dustpan and Prosoco SpillGuard Spill Absorbent and Neutralizer, SafeGuard™ Universal Spill Absorbant, Oil and Grease Stain Remover and Cleaner/Degreaser PD, along with instructions on how to use these products.
- C. If a polished finish is specified, immediately upon completion of finishing operations, exposed concrete surfaces shall be kept moist by covering with damp curing materials or by applying a dissipating wax or resin based curing compound in accordance with Section 03 35 43, Polished Concrete Finishing.
- D. Immediately after placement and installation of curing material, protect concrete from injurious action of the elements and defacement of any kind. Protect concrete from foot or equipment traffic that will damage the surface in any way.
- E. Protect concrete during the curing period not less than nine days from mechanical and physical stresses that may be caused by heavy equipment movement around the slab. Refer to slab protection requirements in DIVISION 01 GENERAL REQUIREMENTS.

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