

405 Coloring and Stamping Concrete

405.1 Description

- (1) This section describes coloring and stamping concrete used to construct work under other contract bid items as well as any special materials and special construction techniques associated with using colored concrete. Additional requirements for stamping concrete are in the contract special provisions.

405.2 Materials

405.2.1 Coloring Concrete

405.2.1.1 Concrete

- (1) Integrally color concrete using non-fading pigments conforming to [ASTM C979](#).
 - For WisDOT red: use synthetic iron oxides at a loading of 6 percent or more by weight of total cementitious material in the mix. Match the concrete color in reasonably close conformance with WisDOT red color, which is similar to AMS Standard 595A: AMS-STD 31136.
- (2) Add integral concrete colorant according to manufacturer's instructions. Provide a copy of those manufacturer instructions to the engineer before producing material for incorporation into the work.
- (3) The department will accept the color based on comparison to WisDOT color samples available for viewing at the department's regional offices.
- (4) Maintain mix characteristics for colored concrete requiring a matching finish. Use the same source, brand, type, and color of cement, supplementary cementitious materials, aggregates, and admixtures for colored concrete throughout the project. Use constant cement content, supplementary cementitious material content, and water/cementitious materials ratio to maintain consistent color.
- (5) Under the Coloring Concrete Custom bid item conform to additional project-specific requirements modifying [405.2.1](#) specified in a required Coloring Concrete Custom contract special provision.

405.2.1.2 Curing Compound

- (1) Furnish a liquid membrane-forming clear curing compound conforming to [ASTM C1315](#), type 1.

405.2.1.3 Admixtures

- (1) Furnish admixtures designed for use with and compatible with colored concrete pigments. Do not use calcium chloride or other admixtures containing chlorides.

405.2.1.4 Colored Concrete Mix Approval

405.2.1.4.1 General

- (1) Obtain engineer approval for colored concrete mixes before placing colored concrete. The engineer will base approval either on a successful performance history or on trial batches. The engineer will evaluate color no earlier than 5 days after pouring and sealing the test concrete. Upon the engineer's approval, the submitted sample panel or the test slab will be the visual quality standard for finished work under the contract.

405.2.1.4.2 Performance History

- (1) Use the same materials mixed in the same proportions as used on another department project where the engineer approved the color the current contract Coloring Concrete bid item designates. Ensure that materials, including admixtures, are of the same type and brand and from the same sources. Provide the following to the engineer for review and approval:
 1. Project Info: Project ID, and location.
 2. Mix proportions: quantities per cubic yard expressed as SSD weights and net water, water to cementitious material ratio, air content, and 28-day or earlier compressive strength.
 3. Materials: type, brand, and source.
 4. Sample panel: a finished colored concrete sample from the previous project having minimum dimensions of 2-foot by 2-foot by 1.5-inch.

405.2.1.4.3 Trial Batches

- (1) The contractor may use preliminary laboratory or field trial batching to establish the mix proportions necessary to conform to the contract-required color.
- (2) Produce test slabs to demonstrate the texture, surface finish, color, and color intensity. At least 2 business days in advance, provide the engineer with the date and time for test slab construction.
- (3) At an engineer-allowed location on the project, place, finish, and cure a 10-foot by 10-foot by 6-inch colored concrete test slab using the same methods proposed for contract work. Produce test slabs using the same workers designated to perform the contract work. Retain samples of cements, sands, aggregates, and color additives used in test slabs for comparison with materials used in contract work.

Use at least a 2-cubic-yard batch or a batch of the size proposed for production whichever is larger. Dispose of surplus or unsuitable material as specified under [205.3.12](#).

- (4) Submit final mix design information to the engineer. Include specific sources and trade names for materials.

405.2.2 Stamping Colored Concrete

- (1) Under the Stamping Colored Concrete bid item, furnish full-depth colored concrete conforming to [405.2.1](#). An required Stamping Colored Concrete contract special provision will contain additional project-specific requirements including the following:
 - Modifications to [405.2.1](#) for coloring requirements.
 - Provisions for required stamps, stamping materials, and surface staining materials.

405.3 Construction

405.3.1 Coloring Concrete

- (1) Construct work incorporating colored concrete conforming to contract specifications under the associate bid items except cure with clear curing compound and use only non-chloride admixtures as specified in [405.2](#).
- (2) Produce consistently colored concrete in full cubic yard increments. The engineer will not allow variations in the quantities, types, or source of materials with the exception of minor adjustments of water and air-entraining agent. Other changes require mix re-approval.
- (3) Schedule to minimize exposure to rapid drying, wind, and full sun before applying curing compound. Do not place colored concrete if rain, snow, or freezing temperatures are forecast within 24-hours.
- (4) Cover or otherwise protect adjacent concrete work from discoloration and spillage while placing and curing colored concrete. Remove and replace discolored concrete as the engineer directs.
- (5) Perform finishing operations consistently to avoid color variation. Do not begin finishing while bleed water is present. The engineer will order removal and replacement of colored concrete if the contractor adds water to the surface to aid in finishing. Apply strokes in the same direction during final finishing and texturing.
- (6) Protect colored concrete from premature drying and excessive cold or hot temperatures by promptly applying curing compound. Do not allow plastic sheeting to come in contact with colored concrete.
- (7) Protect the colored concrete from damage. Do not permit construction traffic or material storage on colored concrete. Exclude foot traffic from colored concrete for at least 24 hours after placement.
- (8) Remove test slabs not permanently incorporated into the work and restore the site after the engineer determines the test slab is no longer needed.

405.3.2 Stamping Colored Concrete

- (1) Under the Stamping Colored Concrete bid item, conform to [405.3.1](#) and to additional project-specific construction requirements for stamping and surface staining operations specified in a required Stamping Colored Concrete contract special provision.

405.4 Measurement

- (1) The department will measure the Coloring Concrete and Stamping Colored Concrete bid items by the cubic yard acceptably incorporated into work done under other contract bid items including material incorporated into one sample panel or one test slab that achieves a color and pattern the engineer accepts as required under [405.3](#) and the Stamping Colored Concrete contract special provision.

405.5 Payment

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
405.0100 - 0199	Coloring Concrete (color)	CY
405.0200	Coloring Concrete Custom	CY
405.1000	Stamping Colored Concrete	CY

- (2) Payment for the Coloring Concrete bid items under this section is full compensation for developing mix designs and providing sample panels or test slabs; for furnishing pigments; for special construction procedures required under [405.3](#); for removing test slabs and restoring the site; and for other costs associated with coloring concrete.
- (3) Payment for Stamping Colored Concrete is full compensation for coloring concrete specified above in [405.5\(2\)](#); for stamping concrete including additional materials under [405.2.2](#) and construction under

[405.3.2](#); for requirements specified in the Stamping Colored Concrete contract special provision; and for other costs associated with stamping concrete.

- (4) The department will pay separately for costs not included in the 405 bid items under the associated contract bid items for work that incorporates colored or colored and stamped concrete.