

**ITEM 11502.CBTHSI M - MISCELLANEOUS PORTLAND CEMENT CONCRETE (PCC)**  
**INLAYS AND OVERLAYS**

**DESCRIPTION**

Construct any or all of the following depending on item numbers included in the contract documents:

- Bonded PCC inlay or overlay.
- Colored, imprinted, bonded PCC inlay or overlay.
- Unbonded PCC inlay or overlay.
- Colored, imprinted, unbonded PCC inlay or overlay.

**MATERIALS**

Apply the requirements of §502-2, Materials and Equipment, unless stated otherwise in this specification.

**Class C, Class D, or Class F Concrete.** Apply the requirements of Section 501, Portland Cement Concrete, if any of these Concrete Classes are specified.

**High-Early-Strength (HES) Concrete.** Apply the requirements of §502-2.02, High-Early-Strength (HES) Concrete, if a HES concrete is specified. HES concrete mix design and all details related to HES concrete production and discharge must be approved by the Regional Materials Engineer before placement. In addition to §502-2.02 requirements, the following requirements apply if the Contractor elects to supply transit mixed concrete or truck mixed concrete.

***Transit Mix HES Concrete.*** Accelerating admixtures may be batched into the concrete at the plant in accordance with §501-2.03F, Admixture Dispensing Systems, or added at the site depending on the amount of acceleration required and the haul time. When adding accelerating admixtures at the site, equip truck mixers with an air pressurized tank that:

- Contains the correct volume of admixture (for the volume of concrete in the truck) dispensed through the plant's admixture dispensing system.
- Discharges the required admixture quantity into the truck mixer drum in less than 1 minute.
- Has a clear plastic tank output hose that leads into the truck mixer drum.
- Has a properly working relief valve.

Determine the fine and coarse aggregate moisture contents twice daily or more frequently if weather conditions change significantly. Compute the corresponding water added to the concrete in the truck from aggregate moisture. Subtract that quantity, as well as the water portion of the admixture in the tank and water added at the plant, from the design water for the truck. Submit these calculations to the NYSDOT plant inspector for approval. Upon approval, write the maximum volume of water to be added to the truck at the site on the delivery ticket.

Discharge the accelerating admixture into the truck mixer drum during or after any water additions at the site. Do not add more water than the maximum volume indicated on the delivery ticket. Add the entire accelerating admixture in 1 uninterrupted operation in 1 minute or less. Apply a maximum of 200 total mixing revolutions before discharge.

***Truck Mix HES Concrete.*** Add the accelerating admixture and water at the site. Equip trucks with an air pressurized tank for accelerating admixtures as described above in Transit Mix HES Concrete and an in-line water flow meter that:

- Resets easily to "0".
- Is mounted to allow easy reading.
- Withstands water temperatures up to 90°C.
- Is equipped with air strainers capable of removing entrapped air within the system.
- Has a batching delivery tolerance of 1% by weight or volume.

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- Has a manufacturer's certified flow rate capacity of 265 lpm.
- Has a minimum actual flow rate of 190 lpm.

The Regional Materials Engineer will measure the actual flow rate and inspect the flow meter prior to use. Do not place any concrete without the Regional Materials Engineer's approval.

Determine the fine and coarse aggregate moisture contents twice daily, or more frequently if weather conditions change significantly. Compute the corresponding water added to the concrete in the truck from aggregate moisture. Subtract that quantity, as well as the water portion of the admixture in the tank, from the design water for the truck. Submit these calculations to the NYSDOT plant inspector for approval. Upon approval, write the maximum volume of water to be added to the truck at the site on the delivery ticket.

Before adding water into the truck mixer, execute twenty dry revolutions at 12 to 18 rpm and reset the flow meter to 0. Add water in 1 uninterrupted operation. No water is to be removed from the truck mixer for any purpose while water is being added to the drum. After the required water designated on the delivery ticket has been added to the concrete in the truck, add the entire accelerating admixture in 1 uninterrupted operation in 1 minute or less. Apply a maximum of 200 mixing revolutions before discharge.

**Coloring Admixture for Integrally Colored Concrete (colored concrete only).** Use a coloring admixture:

- Capable of producing a color conforming to Federal Standard 595B, Colors.
- Certified by the manufacturer as meeting ASTM C979, Standard Specifications for Pigments for Integrally Colored Concrete. Provide the manufacturer's certification to the Engineer before producing any concrete.
- That produces the color specified in the contract documents, or selected by the Engineer if no color is specified.
- Packaged such that each dose is the proper dose for 1 cubic meter of concrete.

Apply coloring admixtures at the manufacturer's recommended dosage rate. Introduce the admixture into the mixer drum in accordance with the manufacturer's recommendations. Provide both those written recommendations to the Engineer before mixing any concrete. Keep the dosage rate consistent for all concrete batches produced such that all batches have the same color. Batch concrete in full cubic meter increments. Deliver batches that are at least one-third the mixer drum capacity. Do not add water to a batch after a portion of that batch has been placed.

**Imprinting Tools (imprinted concrete only).** Use tools capable of producing the pattern specified in the contract documents, or selected by the Engineer if no pattern is specified.

**Release Agent (imprinted concrete only).** Use a release agent recommended by the imprinting tool manufacturer. Apply the release agent evenly to the plastic concrete in accordance with the manufacturer's recommendations. Provide both those written recommendations to the Engineer before mixing any concrete.

**Dry Shake Color Additive and Hardener (colored concrete only).** If specified, use a dry shake color-hardener:

- Supplied by the same manufacturer of the coloring admixture for integrally colored concrete.
- Matching the integrally colored concrete and produces the color specified in the contract documents, or selected by the Engineer if no color is specified.

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Apply the color-hardener evenly to the plastic concrete in accordance with the manufacturer's recommendations. Provide those written recommendations to the Engineer before mixing any concrete.

**Color Matched Caulking Compound (colored concrete only).** Use a caulk:

- Supplied by the same manufacturer of the coloring admixture for integrally colored concrete.
- Matching the integrally colored concrete and produces the color specified in the contract documents, or selected by the Engineer if no color is specified.

**Color Matched Curing Compound (colored concrete only).** Use a curing compound:

- Supplied by the same manufacturer of the coloring admixture for integrally colored concrete.
- Specially formulated for use with colored concrete that meets ASTM C 309, Liquid Membrane-Forming Compounds for Curing Concrete. Provide the manufacturer's certification to the Engineer before producing any concrete.
- Matching the integrally colored concrete and produces the color specified in the contract documents, or selected by the Engineer if no color is specified.

**Portland cement bonding grout (bonded overlays or inlays only).** Use a bonding grout meeting §705-22, Portland Cement Mortar Bonding Grout.

**Fibers.** Use synthetic, fibrillated fibers approved by the Director, Materials Bureau, that are specifically designed for use as secondary concrete reinforcement. Use 1.8 kg of fiber per cubic meter of concrete.

**CONSTRUCTION DETAILS**

Apply the requirements of §502-3, Construction Requirements, except as modified herein. Convene a pre-placement meeting 7 to 14 days before concrete placement with the Engineer and any subcontractors to coordinate all aspects of placement and inspection, including material and equipment requirements, construction methods, and time and personnel requirements.

**Job Site Sample (colored concrete only).** Construct a 1.5 m x 1.5 m (minimum) job site sample at an off-site location selected by the Contractor and approved by the Engineer. Demonstrate the ability to meet the specified color and pattern. Construct as many samples as required by the Engineer (in conjunction with Designers and/or Landscape Architects) until satisfactory colors and patterns are provided. Concrete placed as part of the finished work must conform to the satisfactory sample. The sample will not be part of the finished work.

**Placement Boundaries (bonded inlays only).** Locate the placement such that removal of the concrete substrate prior to inlay will not expose any reinforcement or hardware in the substrate. Mark the placement boundaries on the concrete substrate that will receive the bonded inlay. Placement boundaries must be approved by the Engineer before removing the substrate. The approved placement boundaries will be used to calculate payment.

**Concrete Removal (bonded inlays only).** Neatly saw cut the placement boundaries to a depth equal to the inlay thickness. Remove concrete to the depth, line, and grade of the inlay as indicated in the contract documents ( $\pm 10$  mm) using a milling machine or other equipment approved by the Engineer. If a milling machine is used, keep the milling machine head sufficiently far away from the saw cut boundaries such that the cut faces are not damaged by milling. Mill in accordance with Section 490, Cold Milling.

Remove the concrete between the milled areas and the saw cuts using chipping hammers weighing no more than 13.5 kg (including bit and muffler) equipped with sharp spade bits. Use a maximum air pressure of 700 kPa (measured at the compressor) to power the hammer. Supply an air pressure gauge at the compressor that allows the Engineer to readily monitor air pressure. Remove concrete such that the

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saw cut boundaries remain undamaged. If the saw cut boundary faces are damaged, the Engineer may re-establish the placement boundaries and direct additional saw cutting and concrete removal at no additional cost to the State.

**Surface Preparation (bonded only).** Blast clean the entire surface to receive the bonded concrete (using equipment approved by the Engineer prior to work) such that it is free of dirt, dust, oil, laitance, or other contaminants that inhibit bond. Air blast or vacuum clean after blast cleaning to remove all loose material. Test the cleanliness of the cleaned surface by wiping it with a clean, dark cloth or glove. The cloth must have no dust on it after wiping. If dust is present, re-clean the area.

Immediately after cleaning, soak the entire placement area for 24 hours (minimum) using soaker hoses or by filling the area with water if allowed by the placement grade. If a 24 hour time frame for soaking is not available, apply a bonding grout as discussed below. Immediately before placing concrete, remove the water from the placement area and air blast it such that no standing water remains and the surface is in a saturated, surface-dry condition.

Do not allow any traffic on the prepared surface. If concrete trucks or other traffic must traverse the prepared surface, cover it with polyethylene covers. Use covers of sufficient thickness to withstand the traffic without tearing. Re-clean the surface if it becomes contaminated.

**Bonding Grout (bonded only).** Only use bonding grout if it is not possible to apply a 24 hour (minimum) soak to the placement area as determined by the Engineer. Clean the placement area as detailed above in Surface Preparation (bonded only). Thoroughly wet the placement area immediately before applying the bonding grout such that the surface is damp, but no standing water remains.

Apply the grout immediately before concrete placement such that the grout does not dry before concrete is placed. Vigorously apply the grout with stiff nylon bristle brooms or brushes. Grout the entire prepared surface. If the grout dries before concrete placement, bulkhead the concrete already placed (if any) and stop the remaining placement. Re-clean the placement area having dried grout as described above in Surface Preparation (bonded only). Commence placement after the area is re-cleaned.

**Surface Preparation (unbonded only).** If the unbonded overlay is placed atop a concrete substrate, place a 25 mm – 50 mm thick HMA interlayer on the substrate before placing the concrete. Use a 12.5 mm mix of Item 402.018901 M True & Leveling F9, Superpave HMA, 80 Series Compaction, for the interlayer. Another HMA item may be used if approved by the Engineer and the Regional Materials Engineer. Apply Item 407.01 M, Tack Coat, to the concrete before placing the HMA.

If the unbonded overlay is placed atop an HMA-surfaced substrate, cold mill the HMA, in accordance with Section 490, Cold Milling, to the line and grade of the subsequent overlay prior to placing the concrete. Mill 25 mm – 50 mm (typical). The Engineer may require additional milling if the first milling exposes a loose, raveled, or otherwise deteriorated surface. In this case, make up the additional overlay/inlay thickness with concrete unless otherwise directed by the Engineer. If the first milling partially exposes an underlying concrete substrate, the Engineer may require additional milling to completely expose the underlying concrete substrate. In this case, place a 25 – 50 mm thick HMA interlayer as discussed above.

Power wash the milled surface within 4 hours of milling such that no slurry or residue builds up on the milled surface. Blast clean any milled surface where residue does build up. Air blast the surface immediately before placing concrete to remove all debris and standing water. Provide a clean and dry prepared surface immediately before concrete placement. If traffic must traverse the prepared surface,

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cover it with polyethylene covers. Use covers of sufficient thickness to withstand the traffic without tearing. Re-clean the surface if it becomes contaminated.

Unbonded overlays may be constructed on layers placed in accordance with Section 300, Bases and Subbases. Do not construct an HMA interlayer if the overlay is placed on an unstabilized granular layer placed in accordance with Section 304, Subbase Course.

**Setting Forms.** Securely anchor forms such that they do not move during concrete placement. Flexible, curved, or wood forms may be used.

**Joint Layout.** Joint layout is the Contractor's responsibility. Submit a proposed joint layout to the Engineer at least 10 days prior to concrete placement. Obtain the Engineers joint layout approval before placing concrete. Unbonded placements less than 175 mm thick do not require load transfer devices. Unbonded placements greater than 175 mm thick that are under vehicular traffic require load transfer devices and longitudinal joint ties. Bonded placements do not require pavement hardware.

For placements less than 175 mm thick, construct joints by saw cutting the concrete as soon as the concrete has developed sufficient strength to be cut without raveling or chipping and before uncontrolled cracking occurs. Make saw cuts one-quarter of the placement thickness deep and 3 mm – 6 mm wide. Do not saw cut cold joints between adjacent placements. Construct joints in unbonded placements thicker than 175 mm in accordance with §502-3.06, Joint Construction.

As a minimum, all bonded placements must have joints directly above joints in the underlying concrete substrate.

Saw cut unbonded placement into square slabs dimensioned in accordance with Table 1, Unbonded Slab Dimensions.

**TABLE 1**  
**SLAB DIMENSIONS**

Concrete Thickness	Slab Dimension (Maximum)
50 mm	600 mm
75 mm	900 mm
100 – 175 mm	1.2 m

**Concrete Placement.** Place uncolored concrete in accordance with Section 502.

Place colored concrete in accordance with the coloring admixture manufacturer's recommendations. Provide those written recommendations to the Engineer before mixing any concrete. Protect nearby surfaces from splatter. Tool the placement edges in a manner consistent with the imprint pattern.

**Texturing Concrete.** Broom finish the concrete, unless waived by the Engineer in areas not exposed to foot or vehicular traffic.

**Curing.** Cure the concrete immediately after texturing. Cure uncolored concrete in accordance with §502-3.11, Curing.

Cure colored concrete in accordance with the manufacturer's recommendations using a color matched curing agent. Provide those written recommendations to the Engineer before mixing any concrete. Cure

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all concrete for as long as possible for the concrete class specified. After curing, pressure wash the concrete and apply a sealer recommended by the admixture manufacturer and in accordance with the manufacturer's recommendations. Provide those written recommendations to the Engineer before mixing any concrete.

**METHOD OF MEASUREMENT**

This work will be measured as the number of cubic meters of 11502.CBTHSI, Miscellaneous PCC Inlays and Overlays, satisfactorily placed, measured to the nearest 0.1 m<sup>3</sup>. Bonded inlays will be measured based on the Engineer-approved boundaries marked on the substrate prior to placement as discussed above in Placement Boundaries (bonded only).

**BASIS OF PAYMENT**

Include the cost of all labor, material, and equipment necessary to perform the work in the unit price bid for Miscellaneous PCC Inlays and Overlays. Saw cutting discussed in Placement Boundaries (bonded only), cold milling, tack coat, HMA interlayers, pavement hardware, and bases and subbases are paid for under separate items.

***Payment Will Be Made Under:***

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
11502.CBTHSI M	Miscellaneous PCC Inlays and Overlays	Cubic Meter
<u>C – Concrete</u>	<u>B – Bond</u>	<u>T – Type</u>
1 – Class C	1 – Unbonded	1 – Overlay
2 – Class D	2 – Bonded	2 – Inlay
3 – Class F		
4 – HES		
	<u>H – Color</u>	<u>S – Shake-On</u>
	1 – No	1 – No
	2 – Yes	2 – Yes
		<u>I – Imprint</u>
		1 – No
		2 – Yes