



To: <p style="text-align: center;">SUPERSEDED BY <u>EI 05-009</u> EFFECTIVE <u>9/8/05</u></p>		<p style="text-align: center;"><i>New York State Department of Transportation</i> ENGINEERING INSTRUCTION</p>	<p style="font-size: 2em;">EI 02-009</p>								
Title: ADDITION OF CONCRETE PREWETTING REQUIREMENTS AND ELIMINATION OF REQUIREMENT FOR BONDING GROUT											
Distribution: <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Manufacturers (18)</td> <td><input type="checkbox"/> Surveyors (33)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Main Office (30)</td> <td><input checked="" type="checkbox"/> Consultants (34)</td> </tr> <tr> <td><input type="checkbox"/> Local Govt. (31)</td> <td><input type="checkbox"/> Contractors (39)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Regions/Agencies (32)</td> <td><input type="checkbox"/> _____ ()</td> </tr> </table>		<input type="checkbox"/> Manufacturers (18)	<input type="checkbox"/> Surveyors (33)	<input checked="" type="checkbox"/> Main Office (30)	<input checked="" type="checkbox"/> Consultants (34)	<input type="checkbox"/> Local Govt. (31)	<input type="checkbox"/> Contractors (39)	<input checked="" type="checkbox"/> Regions/Agencies (32)	<input type="checkbox"/> _____ ()	Approved: <div style="text-align: center; margin-top: 10px;">  <hr/> Robert L. Sack, Deputy Chief Engineer (Acting), Technical Services Division </div> <div style="text-align: right; margin-top: 10px;"> <u>12 APR 02</u> Date </div>	
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ADMINISTRATIVE INFORMATION.

- This Engineering Instruction (EI) is effective with projects submitted for the letting of September 12, 2002 and may be applied to existing contracts.
- This EI does not supersede any previous issuances.
- The materials transmitted herewith eventually will be included in an addendum to the Standard Specifications of 2002.

PURPOSE. To transmit changes to the 1995 Standard Specifications, Sections 555, 566, 567, 569, 579, 582, and 583; and Addenda #2 of the 1995 Standard Specifications, Sections 557, 578, and 584 and to eliminate the use of §705-22 Portland Cement Mortar Bonding Grout for bonding new concrete to existing concrete in these specifications.

TECHNICAL INFORMATION. The changes to the Standard Specifications will result in improvement to the quality of bond between new and existing concrete at a reduced cost.

IMPLEMENTATION. The Design Quality Assurance Bureau will insert the attached shelf notes into all contracts that contain the base item numbers 555, 557, 566, 567, 569, 578, 579, 582, 583, and 584 as appropriate, starting with the September 12, 2002 letting. These changes may be implemented on existing contracts at the discretion of the Engineer in Charge. There is not and will not be a pay item for the changes being made. These changes will result in an insignificant change in the cost of performing the work under the pay items that include them.

TRANSMITTED MATERIAL. The material transmitted is as follows:

Shelf note changes to the Standard Specifications of January 2, 1995:

555, 566, 567, 569, 579, 582, and 583

Shelfnote changes to the Addendum No. 2 of the Standard Specifications adopted November 4, 1999:

557, 578, and 584

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BACKGROUND. In 1994, the Department was experiencing cracking in concrete overlays placed directly on top of precast concrete box girders. The typical detail involved placing a 150 mm (6") concrete overlay on the existing box girders. Without prewetting the concrete box girders in advance, the box girder's dry surface absorbed water from the overlay, altering its material properties and ultimately contributing to overlay cracking. Engineering Bulletin 97-040 "Surface Preparation of Prestressed Concrete Beams Prior To Deck Placement" established new prewetting requirements for box girders, which reduced the amount of post overlay cracking. The prewetting requirement from EB 97-040 has since been incorporated into the Standard Specifications (in Addendum #2, Section 557), and the EB has expired.

Bonding grouts have consisted of products meeting the requirements of §705-22, Portland Cement Mortar Bonding Grout, or a mixture of sand and cement at a 1 to 1 ratio with enough water to make a creamy consistency. These materials have been used by the Department for bonding new concrete to existing. It has been Department practice to use bonding grout because it enhances the bond between new and existing concrete. However, when improper construction practices are used the use of bonding grout inhibits the bond. A reduction in bond strength will result if the bonding grout is improperly mixed, allowed to dry out, or applied at an improper thickness. The Department studied the possibility of bonding new concrete to existing without bonding grout and determined that a satisfactory bond could be attained. Prewetting the existing concrete for a minimum of 12 hours was found to be a satisfactory alternative to bonding grout. This Engineering Instruction transmits changes to the specifications to eliminate the use of bonding grout and require 12 hour prewetting.

CONTACT. Direct questions concerning this EI or the attached specification revisions to the Field Engineering 1 office of the Materials Bureau at (518)457-5956.

SECTION 555 - STRUCTURAL CONCRETE

Make the following changes to the Standard Specifications of January 2, 1995, Section 555 - Structural Concrete:

Page 5-48

Line 40; under **§555-2 Materials, §555-2.01 General**, *delete* the following:

"Portland Cement Mortar Bonding Grout

705-22"

Page 5-59

Lines 3-8; under **§555-3 Construction Details, §555-3.07 A. Construction Joints.**, *delete* the following:

"When joining fresh concrete to that which has already set, the concrete in place shall have its surface cut over with a suitable tool to remove all loose and foreign materials. This surface shall be scrubbed with wire brooms and kept wet until the new concrete is placed. Immediately before placing the new concrete the forms shall be drawn tightly against the concrete already in place and the old surface shall be thoroughly coated with a thin coating of 1:1 mortar meeting the requirements of **"§705-22, Portland Cement Mortar Bonding Grout."**

and *replace* with the following:

"When joining fresh concrete to concrete that has already set, the concrete in place shall have its surface scoured or abraded with a suitable tool to remove all loose and foreign materials. This surface shall be scrubbed with wire brooms. After the surface preparation has been accepted, every effort should be made to thoroughly wet the concrete surface, and all porous surfaces to be in contact with new concrete, for 12 hours. This may be accomplished by continuous wetting with soaker hoses or the use of burlap/burlene/etc. where moisture can be maintained. If, in the opinion of the Engineer, conditions or the situation prohibits this, then the surfaces should be wetted for as long as possible. Construction joints must be wetted by a means acceptable to the Engineer using potable water. The Contractor shall remove any puddles of free standing water with oil-free compressed air, and protect the surfaces from drying, so the existing concrete remains in a clean, saturated surface dry condition until placement of the new concrete. Immediately before placing the new concrete, the forms shall be drawn tightly against the concrete already in place."

SECTION 557 - SUPERSTRUCTURE SLABS AND STRUCTURAL APPROACH SLABS

Make the following changes to Addendum No. 2 of the Standard Specifications adopted November 4, 1999, Section 557 - Superstructure Slabs and Structural Slabs:

Page V-15

Lines 1-10; under **§557-3.08 Cold Joints, B. Construction Joints**, *delete* the following:

“The concrete in place shall have its surface scoured or abraded with a suitable tool to remove all loose and foreign materials. This surface shall be thoroughly blastcleaned to remove all laitance and loosened material. The surface shall be thoroughly wetted to provide a saturated surface dry condition at the time of concrete placement. The existing concrete surface shall be thoroughly coated with mortar meeting the requirements of §705-22 Portland Cement Bonding Grout.

The mortar shall be worked into the prepared surface by means of stiff brushes, or other methods acceptable to the Engineer. Mortar shall not be allowed to begin to dry. If drying does begin to occur prior to concrete placement, as evidenced by a light grey color, the Engineer will order the mortar to be completely removed and new mortar placed at no additional cost to the State.”

and *replace* with the following:

“When joining fresh concrete to concrete that has already set, the concrete in place shall have its surface scoured or abraded with a suitable tool to remove all loose and foreign materials. This surface shall be scrubbed with wire brooms. After the surface preparation has been accepted, every effort should be made to thoroughly wet the concrete surface, and all porous surfaces to be in contact with new concrete, for 12 hours. This may be accomplished by continuous wetting with soaker hoses or the use of burlap/burlene/etc. where moisture can be maintained. If, in the opinion of the Engineer, conditions or the situation prohibits this, then the surfaces should be wetted for as long as possible. Construction joints must be wetted by a means acceptable to the Engineer using potable water. The Contractor shall remove any puddles of free standing water with oil-free compressed air, and protect the surfaces from drying, so the existing concrete remains in a clean, saturated surface dry condition until placement of the new concrete. Immediately before placing the new concrete, the forms shall be drawn tightly against the concrete already in place.”

SECTION 566 - MODULAR EXPANSION JOINT SYSTEMS

Make the following changes to the Standard Specifications of January 2, 1995, Section 566 - Modular Expansion Joint Systems:

Page 5-100

Lines 17-20; under **§566-3 Construction Details, §566-3.03 Installation, C.**, *delete* the following:

“At such times that the necessary concrete is placed (after joint system plate installation), existing surfaces shall receive a coating of Portland Cement Bonding Grout (705-22) immediately prior to concrete placement. The cost of the grout shall be included in the unit price bid for the concrete.”

and *replace* with the following:

“This surface shall be scrubbed with wire brooms. After the surface preparation has been accepted, every effort should be made to thoroughly wet the concrete surface, and all porous surfaces to be in contact with new concrete, for 12 hours. If, in the opinion of the Engineer, conditions or the situation prohibits this, then the surfaces should be wetted for as long as possible. Construction joints must be wetted by continuous spraying with hoses using potable water. The Contractor shall remove any puddles of free standing water with oil-free compressed air, and protect the surfaces from drying, so the existing concrete remains in a clean, saturated surface dry condition until placement of the new concrete.”

Lines 27-28; under **§566-3 Construction Details, 566-3.03 Installation, E.**, *delete* the following:

“Prior to concrete placement, all existing concrete surfaces shall be coated with Portland Cement Bonding Grout (705-22).”

and *replace* with the following:

“This surface shall be scrubbed with wire brooms. After the surface preparation has been accepted, every effort should be made to thoroughly wet the concrete surface, and all porous surfaces to be in contact with new concrete, for 12 hours. If, in the opinion of the Engineer, conditions or the situation prohibits this, then the surfaces should be wetted for as long as possible. Construction joints must be wetted by continuous spraying with hoses using potable water. The Contractor shall remove any puddles of free standing water with oil-free compressed air, and protect the surfaces from drying, so the existing concrete remains in a clean, saturated surface dry condition until placement of the new concrete.”

Line 30, *delete*: “, including grout placement,”

SECTION 567 - ARMORED BRIDGE JOINT SYSTEMS

Make the following changes to the Standard Specifications of January 2, 1995, Section 567 - Armored Bridge Joint Systems:

Page 5-105

Lines 12 and 13; under **§567-2 Materials, §567-2.03, B. Material Requirements.**, *delete* the following:

“8. Bonding Grout. The grout shall meet the requirements of §705-22, Portland Cement Mortar Bonding Grout.”

and *replace* with **“8. Vacant.”**

**SECTION 569 - PERMANENT CONCRETE
TRAFFIC BARRIER FOR STRUCTURES**

Make the following changes to the Standard Specifications of January 2, 1995, Section 569 - Permanent Concrete Traffic Barrier for Structures:

Page 5-113

Lines 16-18; under **§569-2 Materials, §569-2.01 Fabrication.**, *delete* the following:

“C. Portland cement bonding grout shall be air entrained with an 8.0% +/- 2.0% air content and shall meet the requirements of 705-22”

and *replace* with **“C. Vacant.”**

Page 5-115

Line 3, *add* as the first sentences of the paragraph:

“Thoroughly wet the structural slab surface and all porous surfaces to be in contact with new concrete for at least 12 hours immediately prior to placement. Remove all standing water with oil-free compressed air, and protect the surfaces from drying, so the concrete remains in a saturated surface dry condition until placement of the new concrete.”

Line 19, *add* after “... shall not apply.”

“Thoroughly wet the structural slab surface and all porous surfaces to be in contact with new concrete for at least 12 hours immediately prior to placement. Remove all standing water with oil-free compressed air, and protect the surfaces from drying, so the concrete remains in a saturated surface dry condition until placement of the new concrete.”

Page 5-116

Lines 18-19; under **§569-3 Construction Details, §569-3.05 Cast-In-Place Concrete - Slipformed., H.**, *delete* the following:

“Immediately prior to placing fresh concrete, the set surface shall be completely coated with portland cement bonding grout, §705-22, thoroughly brushed in.”

Lines 43-44; under **§569-3 Construction Details, §569-3.06 Precast Concrete B.**, *delete* the following:

“All precast barrier shall be installed on grout beds conforming to the requirements of §705-22 as modified herein.”

and *replace* with the following:

“After the cleaned surface has been accepted, thoroughly wet the surface over which the precast barrier will be placed for at least 12 hours immediately prior to placing the grout bed. Remove all standing water with oil-free compressed air, and protect the surface from drying, so the surface remains in a saturated surface dry condition when placing the grout bed. All precast barrier shall be installed on grout beds conforming to the requirements of §701-05 as modified herein.”

SECTION 578 - BONDED CONCRETE OVERLAY FOR STRUCTURAL SLABS

Make the following changes to the Addendum No. 2 of the Standard Specifications adopted November 4, 1999, Section 578 - Bonded Concrete Overlay for Structural Slabs

Page V-26

Line 32; under **§578-2 Materials.**, *delete* the following:

“with the following:”

Lines 33 and 34; *delete* the following:

“**Bonding Grout.** §705-22, with the following: Do not add water once an acceptable consistency is achieved.”

Page V-27

Lines 1 and 2; under **§578-3 CONSTRUCTION DETAILS., §578-3.03 Bonding Grout Placement .**, *delete* the following:

“**578-3.03 Bonding Grout Placement.** Mix bonding grout in a mixer that meets §584-2.04D and place in accordance with §584-3.04.”

and *replace* with the following:

“**578-3.03 Vacant.**”

SECTION 579 - STRUCTURAL SLAB RECONSTRUCTION PREPARATION

Make the following changes to the Standard Specifications of January 2, 1995, Section 579 - Structural Slab Reconstruction Preparation:

Page 5-140

Lines 41 to 43; under **§579-3 Construction Details., 579-3.03 Full Depth Patches., delete** the following:

“Existing concrete surfaces, which will come in contact with new concrete, shall be thoroughly coated with portland cement bonding mortar meeting the requirements of subsection 705-22. The mortar shall be thoroughly worked into the surface by means of stiff nylon brushes.”

and *replace* with the following:

“After blastcleaning has been accepted, thoroughly wet the structural slab surface and all porous surfaces to be in contact with new concrete for at least 12 hours immediately prior to placement. Remove all standing water with oil-free compressed air, and protect the surface from drying, so the concrete remains in a saturated surface dry condition when placing bonding grout.”

SECTION 582 - REMOVAL AND REPLACEMENT OF STRUCTURAL CONCRETE

Make the following changes to the Standard Specifications of January 2, 1995, Section 582 - Removal and Replacement of Structural Concrete:

Page 5-147

Lines 19-22; under **§582-3 Construction Details, §582-3.04 Placement**, *delete* the following:

“Immediately prior to the placement of new material, receiving surfaces shall be air cleaned and thoroughly wetted. Surfaces receiving patching material shall also be prepared in accordance with the manufacturer’s instructions. All air cleaning work shall be done by means of oil-free air. No material shall be placed if the ambient air, or concrete surface temperature is at, or below 7° C.”

and *replace* with the following:

“Air clean the surface with oil-free compressed air. After the surface preparation has been accepted, every effort should be made to thoroughly wet the concrete surface, and all porous surfaces to be in contact with new concrete, for 12 hours. This may be accomplished by continuous wetting with soaker hoses or the use of burlap/burlene/etc. where moisture can be maintained. If, in the opinion of the Engineer, conditions or the situation prohibits this, then the surfaces should be wetted for as long as possible. Surfaces must be wetted by a means acceptable to the Engineer using potable water. The Contractor shall remove any puddles of free standing water with oil-free compressed air, and protect the surfaces from drying, so the existing concrete remains in a clean, saturated surface dry condition until placement of the new concrete. No material shall be placed if the ambient air, or concrete surface temperature is at, or below 7° C.”

SECTION 583 - SHOTCRETE

Make the following changes to the Standard Specifications of January 2, 1995, Section 583 - Shotcrete:

Page 5-150

Lines 37-38; under **§583-3 Construction Details, §583-3.01 Preparation of Surfaces**, *delete* the following:

“Just prior to shotcreting, the sound surface shall be thoroughly cleaned, wetted and air blown.”

and *replace* with the following:

“Air clean the surface with oil-free compressed air. After the surface preparation has been accepted, every effort should be made to thoroughly wet the concrete surface and all porous surfaces to be in contact with new concrete for 12 hours. This may be accomplished by continuous wetting with soaker hoses or the use of burlap/burlene/etc. where moisture can be maintained. If in the opinion of the Engineer conditions or the situation prohibits this then the surfaces should be wetted for as long as possible. Surfaces must be wetted by a means acceptable to the Engineer using potable water. The Contractor shall remove any puddles of free standing water with oil-free compressed air, and protect the surfaces from drying, so the existing concrete remains in a clean, saturated surface dry condition until placement of the new concrete. No material shall be placed if the ambient air, or concrete surface temperature is at, or below 7° C.”

SECTION 584 - SPECIALIZED OVERLAYS FOR STRUCTURAL SLABS

Make the following changes to the Addendum No. 2 of the Standard Specifications adopted November 4, 1999, Section 584 - Specialized Overlays for Structural Slabs:

Page V-29

Lines 11 and 12; under **§584-2 Materials., 584-2.01 General.**, *delete* the following:

“C. Bonding Grout. §705-22, with the following: Do not add water once an acceptable consistency is achieved.”

and *replace* with the following:

“C. Vacant.”

Page V-31

Lines 20 and 21; under **§584-2 Materials., 584-2.04 Equipment.**, *delete* the following:

“D. Bonding Grout Mixer. A mortar mixer with a minimum capacity of 0.10 cubic meters, subject to approval by the Engineer, prior to use.”

and *replace* with the following:

“D. Vacant.”

Pages V-31 to V-32

Lines 41 of Page V-31 to line 3 of Page V-32; under **§584-3 Construction Details., §584-3.04 Bonding Grout Placement** *delete* the following:

“584-3.04 Bonding Grout Placement

A. After structural slab wetting and immediately before placing concrete, use stiff, nylon-bristle brooms to brush a thin (approximately 3 mm) coating of grout into the prepared surfaces, including any slabs, curbs, longitudinal and transverse joints and reinforcing steel. Do not allow the grout to puddle.

B. Apply the grout with straight handled stiff, nylon-bristle brooms around reinforcing steel, and at joints.

C. Limit the application of grout, according to atmospheric conditions, to that area which will be covered with new concrete before the grout begins to dry. Dry bonding grout appears light grey in color and has a chalky texture. Do not place concrete on dry bonding grout.

Concrete placement operations must be interrupted if dry bonding grout is encountered. Install construction dams, wait at least 48 hours, remove dry grout by blast cleaning and place new grout and concrete, all in accordance with this specification.”

and *replace* with the following:

“584-3.04 Vacant.”