
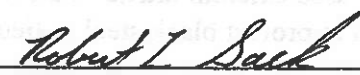


SUPERSEDED BY EB 15-031 EFFECTIVE 9/28/15		<i>New York State</i> <i>Department of</i> <i>Transportation</i> ENGINEERING INSTRUCTION	EI 02-004
Title: ISSUANCE OF SPECIFICATION §711-13, CALCIUM NITRITE BASED CORROSION INHIBITORS			
Distribution: <input type="checkbox"/> Manufacturers (18) <input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Main Office (30) <input checked="" type="checkbox"/> Consultants (34) <input checked="" type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Contractors (39) <input checked="" type="checkbox"/> Regions/Agencies (32) <input checked="" type="checkbox"/> Approved List(138)		Approved:  Robert L. Sack, Deputy Chief Engineer (Acting), Technical Services Division <u>6 MAR 02</u> Date	

ADMINISTRATIVE INFORMATION

This Engineering Instruction (EI) is effective with projects submitted for the letting of July 11, 2002, coinciding with the planned effective date for the proposed *2002 Standard Specifications*.

All specifications which include corrosion inhibitor are hereby disapproved and will have to be rewritten by those responsible for, or wanting to incorporate a specification into a project. The following specifications are disapproved:

ITEM 08555.20 M - 35 MPa CONCRETE WITH CORROSION INHIBITOR

ITEM 09603.67 M - PRECAST CONCRETE APRONS AND WINGWALLS FOR BOX CULVERTS

ITEM 165551.69nn M - PRESTRESSED CONCRETE CYLINDER TEST PILES

ITEM 165551.70nn M - PRESTRESSED CONCRETE CYLINDER PILES

ITEM 16563.0299M - PRESTRESSED CONCRETE BOX BEAM UNITS MADE FROM HIGH PERFORMANCE CONCRETE FOR BEAMS

ITEM 16563.02nnnn M - PRESTRESSED CONCRETE BOX BEAM UNITS WITH CURVED SOFFIT

ITEM 16563.63 M - SPLICED PRESTRESSED CONCRETE BEAMS USING HIGH PERFORMANCE CONCRETE FOR BEAMS

ITEM 18555.95 M - CORROSION INHIBITOR FOR STRUCTURAL CONCRETE

ITEM 718-50 CONCRETE SEGMENTAL CONSTRUCTION

PURPOSE

The purpose of this Engineering Instruction is to create §711-13 Calcium Nitrite Based Corrosion Inhibitors in the Standard Specifications and to establish an Approved List for these materials.

TECHNICAL INFORMATION

This EI will facilitate the acceptance process for calcium nitrite based corrosion inhibitors, and still assure the quality of the material. This change will allow additional suppliers to provide calcium nitrite corrosion inhibitors. This increased competition should result in a decrease in the cost of this material.

TRANSMITTED MATERIALS. Attached are the shelf note for the revisions to Section 706-17 of Addendum No. 2 of the Standard Specifications of November 4, 1999, the revisions to the 700 section of the Standard Specifications of January 2, 1995, and the Materials Procedure for sampling and testing.

BACKGROUND

The Department has used calcium nitrite as a corrosion inhibitor for several years. Calcium Nitrite corrosion inhibitor can be used to protect black steel in lieu of epoxy coating in some applications such as box culverts. It is also used to protect prestressing strands which cannot be epoxy coated. Previous specifications have, in some instances, made it cost prohibitive to approve and use calcium nitrite corrosion inhibitors. Calcium nitrite is a chemical admixture which when added to plastic concrete acts as an anodic inhibitor of corrosion to the reinforcing steel. The admixture is effective in retarding the corrosion reaction at the anode. To be effective, the calcium nitrite must be present in high concentrations. Calcium nitrite is also classified as a non chloride accelerator.

CONTACT

Direct questions to the Field Engineering 1 Section of the Materials Bureau at (518) 457-5956.

Make the following change to Addendum No.2 of the Standard Specifications adopted (November 4, 1999), § 706-17 Precast Concrete Box Culverts:

Page VII-16

Under § 706-17, Fabrication 5. Corrosion Inhibitor, *delete* the entire second paragraph and *insert* the following:

Use only a corrosion inhibitor that complies with §711-13, Calcium Nitrite Based Corrosion Inhibitors, of the Standard Specifications and appears on the Department's Approved List.

Make the following change to the Prestressed Concrete Construction manual dated September, 2000:

Page 4.1

Under 4.1-3 *delete* the first paragraph reading: " The corrosion inhibitors...directed by the Inspector." and *replace* with:

"The corrosion inhibitor shall comply with 711-13 "Calcium Nitrite Based Corrosion Inhibitors" and shall appear on the Department's Approved List. The corrosion inhibitor shall be sampled and tested by the Contractor in the presence of the Inspector following procedures approved by the Director, Materials Bureau."

Add the following to the Standard Specifications of January 2, 1995:

Pg. 7-132: *Add after line 28:*

711-13 CALCIUM NITRITE BASED CORROSION INHIBITORS

SCOPE. This specification covers the material requirements for corrosion inhibitors used in the manufacture of portland cement concrete.


GENERAL. The corrosion inhibitor shall consist of a calcium nitrite solution. The admixture shall not contain chemicals which, when mixed with concrete, produce a condition that is injurious to the quality and durability of the concrete or reinforcing steel.

MATERIAL REQUIREMENTS. The corrosion inhibitor shall consist of a calcium nitrite solution, containing $30 \pm 2\%$ calcium nitrite solids by mass and having a specific gravity of 1.27 ± 0.02 . The corrosion inhibitor, when used in the manufacturing process, shall not produce more than 1000 ppm of chloride ions in the final product as determined by the Department. The pH shall be greater than 8.

SAMPLING AND TESTING. A two liter sample of admixture shall be submitted to the Materials Bureau by the manufacturer applying for approval. Along with the sample, the manufacturer shall provide information to include the manufacturer's name and address, a copy of the product literature, material safety data sheets, and written certification stating that the material meets the physical and chemical requirements of this specification (*711-13, Calcium Nitrite Based Corrosion Inhibitors*).

The Department will test the sample for specific gravity and percent calcium nitrite in accordance with written Department instructions. The sampling and testing procedure is available from the Materials Bureau upon request. Upon testing by the Materials Bureau, if the sample submitted is within tolerance, it will be placed on the Department's Approved List of Materials for corrosion inhibitors. In order to ensure their quality, regular monitor sampling and testing will be performed at the point of use, typically the concrete batching facility.

BASIS OF ACCEPTANCE. Initial approval of the admixture will be based upon the submitted information and tests performed by the Materials Bureau. Upon approval, the name of the product will be placed on the Approved List. Such products will then be accepted on the basis of the brand name labeled plainly on the containers.

 <p>NEW YORK STATE DEPARTMENT OF TRANSPORTATION MATERIALS BUREAU ALBANY, NY 12232-0861</p> <p>MATERIALS PROCEDURE</p>	<p>Materials Procedure: 02-01</p> <p>Issue Date: 02/22/2002 Subject Code: 7.42-2</p>
	<p>SUBJECT: CALCIUM NITRITE BASED CORROSION INHIBITORS (§711-13) SAMPLING AND TESTING</p>
<p>APPROVED: <u>Robert L. Sack</u> Robert L. Sack, Director, Materials Bureau</p>	<p>Supersedes: Dated:</p>

SCOPE

This procedure describes the sampling and testing of Calcium Nitrite Based Corrosion Inhibitor (§711-13) admixture used in the production of various classes of concrete for Department projects.

BACKGROUND

Calcium nitrite is a chemical admixture which, when added to plastic concrete, acts as an anodic inhibitor of corrosion to the reinforcing steel. The admixture is effective in retarding the corrosion reaction at the anode. To be effective, the calcium nitrite must be present in high concentrations. Calcium nitrite is also classified as a non chloride accelerator.

MATERIALS

The corrosion inhibitor shall consist of a calcium nitrite solution as approved by the Director, Materials Bureau, containing $30 \pm 2\%$ calcium nitrite solids by mass and having a specific gravity of 1.27 ± 0.02 . The corrosion inhibitor, when used in the manufacturing process, shall not produce more than 1000 ppm of chloride ions in the final product. The pH shall be greater than 8.

EQUIPMENT

The inspector must have a 1000 ml graduated cylinder and a specific gravity hydrometer graduated to read true specific gravity of liquids. Accuracy must meet or exceed ASTM E100. The hydrometer must be calibrated according to ASTM E126. Include certification of calibration.

SAMPLING

A sample from each delivery of the calcium nitritebased corrosion inhibitor will be taken by or witnessed by a Department Representative (Inspector). The corrosion inhibitor, which must appear on the Department's Approved List, must be accompanied by written certification stating that the material supplied meets the requirements of §711-13 of the Standard Specifications. Remove about 100 ml of the corrosion inhibitor from the bypass valve (see §501-2.03 F) before taking a 200 ml sample with the graduated cylinder.

TESTING

Check the specific gravity of the material using the specific gravity hydrometer. Place the hydrometer in the graduated cylinder and allow the instrument to settle. Take the reading at the point where the liquid surface intersects the graduated stem. Do not take the reading at the top of the meniscus.

ACCEPTANCE

If the specific gravity is >1.25 , the shipment is acceptable for Department work.

If the material is <1.25 , take another 200 mL sample for testing by the Main Office Materials Bureau. Tag the storage container. The material will not be allowed in Department work until the percent calcium nitrite is determined. The Materials Bureau will complete the evaluation of the sample within 14 days in accordance with Department written instructions.

If the percent calcium nitrite is $30\% \pm 2\%$, the material is acceptable for Department work.

CONTACT

Direct questions to the Field Engineering 1 Section of the Materials Bureau at (518) 457-5956.