SECTION 705 - JOINT MATERIALS
705-01 PREFORMED CORK JOINT FILLER

SCOPE. This specification contains the material requirements pertaining to preformed cork joint filler.

GENERAL. The Joint Filler shall be of the dimensions shown on the plans or listed in the specifications. Each piece shall be plainly marked with the manufacturer's name.

MATERIAL REQUIREMENTS. Preformed Cork Joint Filler shall conform to the requirements of ASTM D1752, Type III (Self-expanding Cork).

BASIS OF ACCEPTANCE. Acceptance of this material will be based on the manufacturer's certification of compliance with these specification requirements.

705-02 (VACANT)
705-03 PREFORMED RUBBER JOINT FILLER

SCOPE. This specification contains the material requirements pertaining to preformed rubber joint filler.

GENERAL. The joint filler shall be of the dimensions shown on the plans or in the specifications.

MATERIAL REQUIREMENTS. Preformed Rubber Joint Filler shall conform to the requirements of the Standard Specifications for ASTM D1752, Type (Sponge Rubber), except that the use of reclaimed rubber or factice will be permitted.

BASIS OF ACCEPTANCE. Acceptance of this material will be based on the manufacturer's certification of compliance with these specification requirements.

705-04 AND 705-05 (VACANT)
705-06 CAULKING COMPOUND FOR STRUCTURES

SCOPE. This specification covers the material requirements for caulking compound for structures.

GENERAL. Caulking compound shall be applied with either a pneumatic or ratchet hand gun.

MATERIAL REQUIREMENTS. Caulking compound shall be a material which complies with Federal Specification TT-S-230 Sealing Compound, Synthetic-Rubber Base, Single Component, Chemically Curing. The color of the compound shall be cement mortar grey when tested in the manner described in TT-S-230 and compared against a color standard in possession of the Materials Bureau. This standard will be made available upon written request.

BASIS OF ACCEPTANCE. Acceptance of this material will be based on the manufacturer's certification of compliance with these specification requirements.

705-07 PREMOULDED RESILIENT JOINT FILLER

SCOPE. This specification contains the material requirements for premoulded resilient joint filler.

GENERAL. The joint filler shall be of the dimensions shown on the plans or listed in the specifications. When the material is delivered cut to dimension, it shall be banded in bundles of convenient size.

MATERIAL REQUIREMENTS. The premoulded resilient joint filler shall conform to the requirements of ASTM D1751. The asphalt content requirement may be waived if the material meets other requirements of D1751 based on supplementary testing performed by the Materials Bureau.
§705-08

BASIS OF ACCEPTANCE. Application for approval of pre-moulded resilient joint filler shall be submitted to the Director, Materials Bureau. Upon approval, the product name and its manufacturer will be placed on the Department’s Approved List. Each lift or bundle of joint filler shall be tagged by the manufacturer; the product will be accepted at the work site on the basis of the name and manufacturer of the product appearing on the tag and the Approved List.

The Department reserves the right to sample and test the material after delivery at the project site.

705-08 PREFORMED CLOSED CELL FOAM MATERIAL

SCOPE. This specification covers the requirements for closed cell, cross-linked foam Joint Seal and Joint Filler.

Type I Joint Seal. The joint material shall be a cross-linked foam material.

Type II Joint Filler. The joint material shall be a closed-cell foam filler.

MATERIAL REQUIREMENTS

General. Either joint material shall be impermeable and weather resistant. The physical and chemical properties shall not alter significantly within the temperature range anticipated for road surfaces. In addition, Type I Joint Seal shall be weather-resistant and remain unaffected by road salts and petroleum products.

Installation. If a bonding agent is required, it shall be one which is recommended by the manufacturer and installed according to the manufacturer’s recommended procedure.

Compression, Tension and Recovery. The load required to compress a test specimen to 50% of its original thickness shall be within the range given in Table 705-1. Upon removal of the load, the joint material shall recover to within 5% of its original thickness within 24 hours. Type I Joint Seal shall be capable of maintaining a waterproof joint within the range of 50% compression and 25% tension.

Extrusion. When compressed to 50% of its original thickness with three restrained sides, no joint seal sample shall be extruded more than 6 mm on the free side.

Density. The density of the air-dry material shall be within the range given in Table 705-1.

Water Absorption. No test specimen (50 mm cube, standard) shall have a weight increase of more that given in Table 705-1 after being submerged under 25 mm of water at room temperature for 24 hours.

<table>
<thead>
<tr>
<th>Property</th>
<th>Type I Joint Seal</th>
<th>Type II Joint Filler</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td></td>
<td>69 kPa</td>
<td>414 kPa</td>
</tr>
<tr>
<td>Compression Load</td>
<td>28 kPa</td>
<td>--</td>
</tr>
<tr>
<td>Density</td>
<td>42 kg/m³</td>
<td>54 kg/m³</td>
</tr>
<tr>
<td></td>
<td>28 kg/m³</td>
<td>48 kg/m³</td>
</tr>
<tr>
<td>Water Absorption</td>
<td>3 %</td>
<td>7 %</td>
</tr>
</tbody>
</table>

DIMENSIONS. The joint material shall be of the thickness and width described in the contract documents within a tolerance of +10% and -2%. Type I Joint Seal shall be heat welded to the proper dimensions by the manufacturer.

BASIS OF ACCEPTANCE. Acceptance of this material will be based on the manufacturer’s certification of compliance with these specification requirements.
§705-9

705-09 PREFORMED ELASTIC BRIDGE JOINT SEALER

SCOPE. This specification covers the material requirements for preformed elastic bridge joint sealer for use in bridge joints.

MATERIAL REQUIREMENTS. The preformed elastic joint sealer material shall be vulcanized elastomeric compound using polymerized chloroprene as the only basic elastomer.

Flexibility. The sealer shape shall be capable of withstanding compression, rotation, or other joint movements without change in the position of the point of foldability, misalignment, or other conditions felt detrimental by the Director, Materials Bureau. The sealer shall exhibit sufficient sealing pressures throughout its expected compression range to assure that no deleterious materials enter the joint.

The joint sealer material shall be tested in accordance with AASHTO M297 except that Compression Deflection properties shall be determined in accordance with Department written instructions. Compression Deflection Properties, LCmin and LCmax, shall comply to that specified in Table 705-2. Test specimens shall be cut and/or buffed from joint seal samples.

<table>
<thead>
<tr>
<th>Nominal Seal Size(mm)</th>
<th>LC Min.%</th>
<th>LC Max.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>76 or less</td>
<td>85</td>
<td>55</td>
</tr>
<tr>
<td>89</td>
<td>85</td>
<td>50</td>
</tr>
<tr>
<td>102</td>
<td>85</td>
<td>48</td>
</tr>
<tr>
<td>127</td>
<td>85</td>
<td>45</td>
</tr>
<tr>
<td>152</td>
<td>90</td>
<td>45</td>
</tr>
</tbody>
</table>

DIMENSIONS. The measured width and depth of joint seal material shall meet the minimum and maximum allowable dimensions as determined from the original drawings and the applied tolerances.

Dimensional Tolerances. The nominal height of the uncompressed sealer shall be greater than or equal to the nominal uncompressed width.

The measured width and height of joint material shall satisfy the minimum and maximum allowable dimensions as determined from the nominal dimensions shown on the approved drawings and the following dimensional tolerances.

A dimensional tolerance of ±5% of the nominal dimensions shall be applied to seals less than 102 mm in width. A dimensional tolerance of ±6.4 mm shall be applied to the nominal dimensions for seals greater than or equal to 102 mm in width.

SAMPLING. All preformed elastic bridge joint sealer to be used on Department projects shall be sampled from manufactured lots in accordance with procedural directives of the Materials Bureau by a representative of the Department in lengths as shown in Table 2 AASHTO M297. Joint sealer shall be shipped in an untaledced condition.

SERVICEABILITY

Installation and Performance Requirements. Each lot of joint sealer submitted for Department approval shall demonstrate that it possesses the properties necessary for satisfactory field installation. The sealer shall not exhibit any twisting, rolling, misalignment of opposite top edges, tendencies to trap incompressibles or any other qualities which shall be deemed detrimental by the Department to the sealer's proper installation and performance.
Joint Wall Contact with Sealer. The top edges of the vertical walls shall remain in contact with the joint sealer faces throughout the compression range to which the sealer will be subjected in use.

Lubricant. The lubricant used to install the sealer shall conform to the requirements of §705-13, Lubricant for Preformed Elastic Joint Sealer, unless otherwise specified in the proposal.

BASIS OF ACCEPTANCE. All bridge joint sealers shall be pre-approved by the Director, Materials Bureau, prior to the submission of any individual production lot for acceptance. Such pre-approval shall be requested in writing and be accompanied by a sample of each size sealer proposed and a detailed drawing of the shape including nominal dimensions. The sample size shall be in accordance with Table 2 AASHTO M297 Minimum Lengths of Seal Sample.

This material will be considered for acceptance in stock lot quantities at manufacturing locations in accordance with procedural directives of the Materials Bureau.

705-10 PREFORMED ELASTIC LONGITUDINAL JOINT SEAL

SCOPE. This specification covers the material requirements for preformed elastic joint seal for use in longitudinal concrete pavement joints.

GENERAL. The preformed elastic material shall be a vulcanized elastomeric compound using polymerized chloroprene as the only basic elastomer. The shape of any joint seal shall be approved by the Director of the Materials Bureau prior to the submission of any individual production lot for approval. Such approval shall be requested in writing and be accompanied by a detailed drawing of the shape and a 4.5 m length of the proposed seal. The lubricant used to install the joint seal shall conform to §705-13, Lubricant for Preformed Elastic Joint Sealer, unless otherwise specified.

MATERIAL REQUIREMENTS

Physical Requirements. The joint seal material shall be tested in accordance with AASHTO M220 and meet the physical requirements therein. The requirements for compression-deflection, ozone resistance, and low-temperature recovery @ -10°C are waived.

The minimum percentage requirements for low-temperature recovery at -29°C, and for high temperature recovery at 100°C, shall be modified to 75%. Measurements for recovery may be made using an electronic caliper in addition to methods specified. The following exceptions shall be made to the recovery test when the seal shape has lips (a small protrusion on the top longitudinal edge). The seal shall be compressed to 50% of the nominal width of the seal. The denominator for the percent recovery calculation, however, shall be the width between the outer edges of the lips provided on the manufacturer's drawing. The numerator or recovered width shall be measured between the outer edges of the lips.

SAMPLING. All preformed elastic joint seal to be used on Department projects shall be sampled from manufactured lots by a representative of the Department.

BASIS OF ACCEPTANCE. This material will be considered for acceptance in stock lot quantities at manufacturing locations in accordance with procedural directives of the Materials Bureau.

705-11 POLYVINYL CHLORIDE EXTRUDED SHAPES AND SHEET MATERIAL

SCOPE. This specification covers the quality requirements for polyvinyl chloride extruded shapes and sheet material for use in expansion, contraction, construction joints and drainage troughs.
§705-11

GENERAL. The PVC material from which the shapes shall be extruded shall not contain any reclaimed, reground or reworked material whatsoever, but shall be compounded from virgin PVC resins, plasticizers, stabilizers and such materials that when compounded it shall meet the physical requirements contained in this specification.

Material shall be extruded in such a manner that all cross sections shall be dense, homogeneous and free from porosity or other imperfections.

The dimensional tolerances shall be as shown on the plans.

All splices shall be heat welded as approved by the Engineer.

Each extrusion shall be plainly marked at 1.5 m intervals with the manufacturer's name, lot number, and type.

MATERIAL REQUIREMENTS. The material for the extruded shapes shall meet the following performance requirements:

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM Test Method</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength, kPa</td>
<td>D412, Die C</td>
<td>9650 min.</td>
</tr>
<tr>
<td>Ultimate elongation, percent</td>
<td>D412, Die C</td>
<td>250 min.</td>
</tr>
<tr>
<td>Hardness, Type A durometer</td>
<td>D2240 *</td>
<td>65-88</td>
</tr>
<tr>
<td>Resistance to alkali</td>
<td>D543 **</td>
<td>-</td>
</tr>
<tr>
<td>Weight change, percent</td>
<td>-</td>
<td>-0.10 to +0.25</td>
</tr>
<tr>
<td>Hardness, Type A durometer points change</td>
<td>-</td>
<td>+5</td>
</tr>
<tr>
<td>Tensile strength, percent change</td>
<td>-</td>
<td>-15 max.</td>
</tr>
<tr>
<td>Water absorption, 48 hours percent</td>
<td>D570</td>
<td>0.5 max.</td>
</tr>
<tr>
<td>Specify gravity</td>
<td>D792</td>
<td>1.42 max.</td>
</tr>
</tbody>
</table>

* The hardness test shall be performed in accordance with D2240 except that the material is pressed to the durometer by thumb.

** Resistance to alkali. A specimen, weighing about 75 g, will be cut from the sample. The specimen will be washed in tap water, rinsed with distilled water, wiped with a clean cloth, and allowed to dry in laboratory air for approximately 1 hour. The weight of each specimen, to the nearest 0.001 g, will be recorded. The durometer reading will be taken as noted above. The specimens will be completely immersed in a freshly made solution containing 5.0 g of chemically pure potassium hydroxide and 5.0 g of chemically pure sodium hydroxide in one liter of distilled water, kept at 21°C to 24°C. At the end of seven days the specimens will be removed, rinsed with distilled water, the surfaces wiped with a clean cloth, and allowed to dry in laboratory air for approximately 1 hour. The weight and durometer hardness will be measured and recorded. Tensile strength shall be determined as noted above. The weight and tensile strength change shall be reported as a percentage of the original readings. The hardness change will be reported as the change relative to the original reading.

Cold Bend Test. A cold bend test shall be made by subjecting a 13 mm by 152 mm by 3 mm strip of extrusion material to a temperature of -29°C for 2 hours. The strip shall immediately thereafter be bent 180 degrees around a rod of 6 mm diameter by applying sufficient force to hold the sample in intimate contact with the rod. The sample shall then be examined for evidence of cracking. There shall be no cracking of the samples.

BASIS OF ACCEPTANCE. This material will be considered for acceptance in stock lot quantities at manufacturing locations in accordance with procedural directives of the Materials Bureau. Any unauthorized tampering or breaking of Department seals applied to this material between the time of sampling and use of the product will be cause for rejection of the material.

705-12 PREFORMED ELASTIC TRANSVERSE CONTRACTION AND EXPANSION JOINT SEAL

SCOPE. This specification covers the material requirements for preformed elastic joint seal for use in transverse contraction joints and transverse expansion joints in concrete pavement.

7-50 NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS of January 2, 2002
GENERAL. The preformed elastic material shall be a vulcanized elastomeric compound using polymerized chloroprene as the only basic elastomer. The shape of any joint seal, from any manufacturer, shall be approved by the Director of the Materials Bureau prior to the submission of any individual production lot for approval. Such approval shall be requested in writing and be accompanied by a detailed drawing of the shape and a 4.5 m length of the proposed seal. The lubricant used to install the joint seal shall conform to §705-13, Lubricant for Preformed Elastic Joint Sealer, unless otherwise specified.

MATERIALS REQUIREMENTS

Geometric Requirements. Joint seals shall meet the geometric requirements in the following table:

<table>
<thead>
<tr>
<th>Property or Requirement At Specified Width</th>
<th>Type of Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17 mm Transverse Contraction</td>
</tr>
<tr>
<td></td>
<td>20 mm Transverse Contraction</td>
</tr>
<tr>
<td></td>
<td>32 mm Transverse Contraction</td>
</tr>
<tr>
<td></td>
<td>41 mm Transverse Expansion</td>
</tr>
<tr>
<td>Overall width, min.</td>
<td>17 mm</td>
</tr>
<tr>
<td></td>
<td>20 mm</td>
</tr>
<tr>
<td></td>
<td>32 mm</td>
</tr>
<tr>
<td></td>
<td>41 mm</td>
</tr>
<tr>
<td>Contact Dimension, min.</td>
<td>17 mm @ 16 mm width</td>
</tr>
<tr>
<td></td>
<td>20 mm @ 16 mm width</td>
</tr>
<tr>
<td></td>
<td>22 mm @ 25 mm width</td>
</tr>
<tr>
<td></td>
<td>22 mm @ 32 mm width</td>
</tr>
<tr>
<td>Overall depth, max.</td>
<td>50 mm @ 13 mm width</td>
</tr>
<tr>
<td></td>
<td>50 mm @ 13 mm width</td>
</tr>
<tr>
<td></td>
<td>50 mm @ 16 mm width</td>
</tr>
<tr>
<td></td>
<td>50 mm @ 22 mm width</td>
</tr>
</tbody>
</table>

Physical Requirements. For all properties except compression-deflection, low-temperature recovery @ -10°C, and ozone resistance, the joint seal material shall be tested in accordance with AASHTO M220 and meet the physical requirements therein. The requirements for compression-deflection, low-temperature recovery @ -10°C and ozone resistance are waived. Measurements for recovery may be made using an electronic caliper in addition to methods specified.

The following exceptions shall be made to the recovery test when the seal shape has a lip (a small protrusion at the top longitudinal edge). The seal shall be compressed to 50% of the nominal width of the seal. The denominator for the percent recovery calculation, however, shall be the width between the outer edges of the lips on the manufacturer’s drawing. The numerator or recovered width shall be measured between the outer edges of the lips.

Force-Deflection Requirements. Force-Deflection properties shall be determined in accordance with the force-deflection test established by the Materials Bureau. A description of this test is available on request from the Materials Bureau.

The preformed elastic transverse joint seal shall conform to the following force-deflection requirements:

<table>
<thead>
<tr>
<th>Property or Requirement At Specified Width</th>
<th>Type of Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17 mm Transverse Contraction</td>
</tr>
<tr>
<td></td>
<td>20 mm Transverse Contraction</td>
</tr>
<tr>
<td></td>
<td>32 mm Transverse Contraction</td>
</tr>
<tr>
<td></td>
<td>41 mm Transverse Expansion</td>
</tr>
<tr>
<td>Min. Resisting Force (N/mm)</td>
<td>0.5 @ 16 mm width</td>
</tr>
<tr>
<td></td>
<td>0.5 @ 16 mm width</td>
</tr>
<tr>
<td></td>
<td>0.5 @ 25 mm width</td>
</tr>
<tr>
<td></td>
<td>0.5 @ 32 mm width</td>
</tr>
<tr>
<td>Max. Resisting Force (N/mm)</td>
<td>1.9 @ 13 mm width</td>
</tr>
<tr>
<td></td>
<td>1.6 @ 13 mm width</td>
</tr>
<tr>
<td></td>
<td>2.1 @ 16 mm width</td>
</tr>
<tr>
<td></td>
<td>3.5 @ 22 mm width</td>
</tr>
</tbody>
</table>
§705-12

The seal shall not creep more than 6 mm horizontally during force-deflection testing, nor shall there be any loss of contact between the top edges of the seal and the compression plates.

All test sections used in the above procedures shall be cut and/or buffed from the joint seal specimens.

**SAMPLING.** All preformed elastic joint seal to be used on Department projects shall be sampled from manufactured lots by a representative of the Department.

**BASIS OF ACCEPTANCE.** This material will be considered for acceptance in stock lot quantities at manufacturing locations in accordance with procedural directives of the Materials Bureau.

705-13 LUBRICANT FOR PREFORMED ELASTIC JOINT SEALER

**SCOPE.** This specification covers the lubricant used for the installation of preformed elastic joint sealers.

**GENERAL.** The lubricant shall be a one-component polychloroprene compound containing only soluble phenolic resins blended together with anti-oxidants and acid acceptors in an aromatic hydrocarbon solvent mixture.

**MATERIAL REQUIREMENTS.** The lubricant shall meet the following physical requirements:

For use with concrete pavement sealers the lubricant shall conform to the requirements of ASTM D2835.

For use with bridge sealers the lubricant shall conform to the requirements of ASTM D4070.

**PACKAGING.** Each lot of the lubricant shall be delivered in containers plainly marked with the manufacturer's name or trademark, lot number and date of manufacture.

**BASIS OF ACCEPTANCE.** The basis of acceptance for the lubricant shall be the manufacturer's certification as to compliance with this specification which shall accompany the material delivered to the job site. Any lubricant not used within 270 days of its manufacture shall be unacceptable.

The Department reserves the right to sample and test this material subsequent to delivery at the project site.

705-14 LONGITUDINAL JOINT TIES

**SCOPE.** This specification covers the requirements for Longitudinal Joint Ties (LJT) used in portland cement concrete pavements.

**GENERAL.** All Longitudinal Joint Tie systems not appearing on the standard sheets shall be tested and subject to approval before their use is allowed for Department work. Application for approval of such LJT systems shall be made to the Director, Materials Bureau. Systems found suitable shall be detailed by the Department on the appropriate standard sheet. Approved epoxy coatings, and epoxy coating applicators shall be listed on the Department's List of Approved Products. All requirements of this specification and any directives shown on the standard sheets or List of Approved Products shall apply.

**MATERIAL REQUIREMENTS**

**A. Longitudinal Joint Tie Material.** All components of LJT systems shall be made of steel. Each component shall be capable of complying with the requirements stated in the following formula when the minimum numerical values for the steel used to manufacture the LJT in question are substituted in the formula:

\[
F \times A = 45 \text{ kN}
\]

where:  
- \(F\) = Minimum yield strength of the LJT component (kPa)  
- \(A\) = Minimum cross sectional area of the LJT component (mm²)

If the numerical values of the parameters fail to satisfy the requirements of the formula, the LJT...
system shall be rejected.

**B Epoxy Coating Material.** Epoxy coatings meeting the applicable requirements of §709-04 Epoxy Coated Bar Reinforcement, Grade 420 and which appear on the Department's Approved List titled "Epoxy Coatings for Steel Reinforcing Bars" are acceptable. Epoxy coatings not tested under §709-04 shall be tested in accordance with this specification, and if found suitable will be approved and placed on the Department's Approved List titled "Epoxy Coatings for Longitudinal Joint Ties."

**C. Corrosion Inhibitive System for Threaded Ties.** Approved corrosion inhibitive coatings for threaded portions of the multiple piece LJTs shall comply with one of the following NYSDOT specifications:

- Section 702 - Bituminous Materials, materials designations §702-3201, §702-3301 or §702-3401 as defined in TABLE 702-5 Asphalt Emulsions, Medium Setting.
- A thread-sealing compound approved by the Materials Bureau

Corrosion inhibitive coatings shall be applied to the threads when the LJTs are installed. The coating shall be applied in such a manner that an unbroken seal is formed to protect the ties from corrosion.

**FABRICATION.** All LJT systems supplied to the Department shall comply with all requirements listed below:

**A. Coating Applicator.** The facilities of the coating application and the method of application for the epoxy shall be subject to approval by the Director, Materials Bureau. Upon approval, the complete name and address of the coating applicator will be placed on the Department's List of Approved Products titled "Epoxy Coatings for Longitudinal Joint Ties," or "Epoxy Coatings for Steel Reinforcing Bars."

**B. Surface Preparation of Metal.** All surfaces of the LJT or its components shall be completely blast cleaned in accordance with Steel Structures Painting Council - Surface Preparation Specification No. 10 (SSPC-SP10), Near White Blast Cleaning. After blast cleaning, the cleaned surfaces of the LJT or its components shall be defined by, and comply with SSPC-Vis 1-89, Pictorial Standards A SP 10, B SP 10, or C SP 10, as applicable. The approved epoxy coating shall be applied to the cleaned surfaces as soon as possible after cleaning and before visible oxidation occurs. In no case shall more than eight (8) hours elapse between cleaning and coating.

**C. Coating Application.** The coating shall be applied in accordance with the recommendations of the coating manufacturer and as approved by the Director, Materials Bureau.

**D. Coating Thickness.** The epoxy coating shall be applied in a smooth uniform coat. After curing, the coating thickness shall be 0.25 ± 0.05 mm unless otherwise approved by the Director, Materials Bureau and published on the Department's List of Approved Products titled "Epoxy Coatings for Longitudinal Joint Ties." Coating thickness shall be determined and controlled by the coating applicator by taking measurements on a representative number of bars from each production run. Coating thickness measurements shall be conducted by the method outlined in ASTM G12.

**E. Continuity of Coating**

1. The spray coating shall be visually checked for continuity after cure. It shall be free of holes, voids, contamination, cracks and damaged areas.

2. The coating shall not have more than two holidays (pinholes not visible to the naked eyes) in any 300 mm of coating length. A holiday detector shall be used, in accordance with the manufacturer's instructions, to check for holidays on a representative number of bars in each production run.

3. LJTs with uncoated areas within 50 mm from the ends of the ties due to handling during
§705-14

fabrication will be acceptable. The cross-sections of the ends of the fully assembled LJT systems may be uncoated.

F. Coating Cure. Before shipment from the applicator’s facilities, the coating applicator shall check each production run to determine that the LJT systems have fully cured coatings. The LJT’s shall not be shipped until the epoxy coatings are fully cured.

G. Shop Repair of Damaged Coatings. Epoxy coated LJT’s that do not meet the requirements for Coating Thickness, Continuity of Coating, or Coating Cure shall not be repaired. Instead, LJT’s with these defects shall be replaced or, alternatively, stripped of epoxy coating, recleaned and recoated in full conformance with the requirements of this specification.

H. Field Repair of Damaged Coatings. LJT’s with coating breaks, due to handling, that exceed 6 mm in any dimension shall not be incorporated into the pavement. Uncoated areas as defined in E.3. above are not cause for rejection and do not require repair.

The Contractor shall set aside such damaged units and may effect a field repair. Coating breaks that exceed 6 mm in any dimension may be repaired with a patching material supplied by the epoxy coating manufacturer. The patching material shall be an epoxy compatible with the epoxy coating and inert in concrete. The repair material shall be applied only to the general area requiring repair. Dipping of the tie in repair material or liberal coating of undamaged areas shall not be allowed.

TESTING

A. Quality Control. The coating applicator shall be responsible for performing quality control and tests. This will include inspection for compliance with the requirements of Coating Thickness, Continuity of Coating, and Coating Cure.

B. Laboratory Testing. Unless otherwise stated, the following laboratory tests will be performed by the Materials Bureau on all LJT systems not appearing on the standard sheets and for epoxy coating systems not appearing on the Department’s List of Approved Products.

1. Pullout Test. Each epoxy coated LJT component, as well as the fully assembled and coated LJT system shall be capable of withstanding a minimum pullout force of 45 kN without yielding. The pullout test shall be conducted in accordance with NYSDOT test method 705-E1 - Longitudinal Joint Tie Test Method.

2. Corrosion Test. LJT epoxy coating systems shall be tested for corrosion resistance in accordance with the Corrosion Testing procedure (Section VIII) of NYSDOT test method 705-E1 - Longitudinal Joint Tie Test Method. The epoxy coating system shall survive a minimum of 25 freeze-thaw (FT) cycles. When viewed under 5 power magnification, the degree of corrosion observed shall be a rust grade of 10, or better, when rated in accordance with ASTM D610 Evaluating Degree of Rusting on Painted Steel Surfaces.

For purposes of this testing, the LJT supplier shall provide the Director, Materials Bureau with three neat, clear, legible 216 x 279 mm shop drawings depicting the LJT system. Twelve (12) LJT samples with epoxy coating shall be submitted for testing. Upon receipt of the samples and corresponding shop drawings, the samples will be examined and compared for dimensional conformance with the dimensions shown on the shop drawings. Any discrepancy shall be cause for rejection of the ties and no further testing shall be conducted.

BASIS OF ACCEPTANCE. Epoxy coated longitudinal joint ties shall be accepted by the Engineer at the contract site on the basis of the following:

1. The epoxy coating manufacturer’s certification that the coating material is the same as that approved by the Materials Bureau.
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2. The coating applicator’s certification that the IJT’s have been coated and tested and that they conform to the requirements of this specification.
3. Longitudinal Joint Tie manufacturer’s certification that the metal used conforms to the requirements of this specification. The ASTM Designation and Grade shall be included.
4. The appearance of the LJT system on the appropriate standard sheet or as approved by the Director, Materials Bureau.
5. The appearance of the name of the coating applicator and epoxy coating material on the Department’s Approved List of Products.

705-15 TRANSVERSE JOINT SUPPORTS

SCOPE. This specification covers the requirements for load transfer devices in portland cement concrete pavement transverse joints.

GENERAL. All Transverse Joint Support systems not referenced on the Department’s Approved List shall be subject to testing and approval before their use is allowed for Department work. Application for approval of such Transverse Joint Support systems shall be made to the Director, Materials Bureau, at least 120 days before their intended use. Systems found suitable shall be assigned a unique reference number, which shall be listed on the Department’s Approved List. All requirements of this specification, those portions of referenced specifications, and the Materials Details referenced by the Approved List, shall apply. In case of conflict between the requirements of this specification and the referenced specifications, the requirements of this specification or the instructions of the Director, Materials Bureau, shall apply.

For approved transverse joint support assemblies, any proposed changes in materials and/or design will require review and approval by the Director, Materials Bureau.

MATERIAL REQUIREMENTS

A. General Requirements. Dowels shall be made of steel with 345 MPa minimum yield strength. Materials other than steel may be proposed, but shall be subject to the prior approval of the Director, Materials Bureau. The free ends of dowels or bar type elements shall be saw cut and free of burrs or projections that would restrict movement.

Dowel coatings shall be continuous and undamaged for the full length of the element. Elements with perforated, cracked, damaged or improperly applied coatings will be rejected. Any damage which results from welding or mechanical fixation to achieve a fixed end condition shall not extend more than 25 mm in from the weld or point of fixation. All coatings will be tested and approved by the Materials Bureau in accordance with these specifications. The dowel coating thickness and material shall be as required by the Materials Details referenced by the Approved List or as approved by the Director, Materials Bureau.

Bond breaker material (when applicable) will be subject to approval by the Materials Bureau and shall be as required by the Materials Details referenced by the Approved List. The use of field applied bond breakers will not be allowed. Bond breaker (when required) shall completely coat the dowel element to within 150 mm of the fixed end.

Premoulded resilient joint filler shall meet the requirements of §705-07 of the Standard Specifications.

B. Physical Requirements. When tested in accordance with AASHTO T253, Standard Method of testing Corrosion Resistant Coated Dowel Bars, the dowel elements shall meet the requirements of AASHTO M254 for Load Deflection, Pull-out, Corrosion, and Abrasion.

COATING APPLICATION. Acceptable epoxy coating applicators shall be those found on the Department’s List of Approved Products titled “Applicators For Steel Reinforcing Bars (709-04)”, “Epoxy Coatings For Longitudinal Joint Ties (705-14)” or “Epoxy Coatings For Dowel Bars For
§705-15

Transverse Joint Supports (705-15)”. Applicators of coatings other than epoxy will be subject to approval by the Director of the Materials Bureau.

GEOMETRIC REQUIREMENTS

A. Dowels. Joint support dowels shall be at least 460 mm and shall have a minimum bearing area of 10,300 mm². They shall have a uniform cross sectional shape for their entire length. Dowels with circular cross sections shall have a minimum diameter equal to 1/8 of the pavement design thickness exclusive of any coating(s).

B. Joint Support Assemblies. Transverse joint support assemblies shall meet the following general requirements as well as the applicable additional requirements given below for contraction, expansion, or construction joints:

1. Construction or Standard Sheet Requirements. Unless otherwise indicated by the plans or in the proposal, transverse joint support assemblies shall be constructed with one (1) dowel for each 300 mm of lane width. The locations of the dowels within the assemblies shall comply with the following geometry:

   a. The axis of the two end dowels shall be located such that they are spaced 150 ± 13 mm from the lane edges after concrete is placed.

   b. The axis of the intervening ten dowels shall be transversely spaced at 300 ± 13 mm centers relative to the axes of the two end dowels.

   c. The axis of each dowel shall be held at the mid-depth of the concrete pavement slab ± 6 mm.

   d. The assemblies shall be placed with each individual element's axis aligned and held parallel to the centerline horizontally and vertically to the profile, to 1 mm per 100 mm.

   e. The dowels shall be longitudinally restrained such that the maximum longitudinal displacement of the midjoint of each dowel relative to the center of the joint is 25 mm.

2. Transverse Contraction Joints. Joint support assemblies used in contraction joints shall meet the general requirements shown in B1 above.

3. Transverse Expansion Joints. Joint support assemblies used in expansion joints shall meet the general requirements given in B1 above. In addition, a one piece premoulded resilient joint filler 19 mm thick shall be included in the assembly. The joint filler shall extend continuously across the lane width and shall extend from not less than 50 mm below the top of the pavement surface to the bottom of the pavement slab. The joint filler shall be protected on top by a metal finishing cap and supported to maintain a vertical position. The dowels shall have caps on the working end of the dowels with an acceptable means to allow for movement due to concrete expansion.

4. Transverse Construction Joints. Joint support assemblies used in construction joints shall meet the general requirements given in B1 above. In addition, a bulkhead device shown on the Materials Details referenced by the Approved List, or as approved by the DCEC, shall be used to form construction joints. The bulkhead device shall have a rigid center plate extending vertically downward from the pavement surface, through the joint support assembly, to the bottom of the pavement.

TESTS. When joint support assemblies are proposed for testing and approval, Materials Details (detailed shop drawings) for transverse contraction, construction and expansion joint assemblies, drawn by the manufacturer, shall be submitted for approval before any fabrication is started. These drawings shall be neat, clear, and legible and shall be in the manner and form required by the Director, Materials
Bureau. The supplier shall also provide certification from the rolling mill as to the type and grade of steel used in the joint support elements.

The laboratory and field tests described below shall be conducted for transverse joint support elements and assemblies not referenced by the Department's Approved List.

**A. Laboratory Tests.** Transverse joint support elements and assemblies being considered for approval will be subjected to the Load-deflection, Pull-out, and Corrosion Abrasion tests defined by AASHTO T253, Coated Dowel Bars. Only joint support assemblies, exhibiting satisfactory performance in these laboratory tests, will be considered for trial installation in the field test. For purposes of laboratory testing, two complete assemblies containing joint support elements and six (6) additional loose coated junior support elements shall be submitted to the Director, Materials Bureau. One assembly shall be fabricated to meet the requirements for a transverse contraction joint; the other shall meet the requirements of a transverse expansion joint. Samples shall be submitted at least 120 days prior to their intended use.

If the proposed assembly passes the laboratory tests and is considered acceptable to the Director, Materials Bureau, approval will be given to use the system in a field test at a project site on a trial basis.

**B. Field Test.** Materials Bureau personnel will observe the installation of transverse joint support assemblies being considered for approval. Specific attention will be given to the alignment of joint support elements before and during paving operations. Before approval can be given for the general use of a transverse joint support assembly, it shall exhibit satisfactory performance in the field test. Transverse joint support assemblies that do not exhibit satisfactory performance during the field test will be rejected. All rejected assemblies shall be replaced with acceptable assemblies at no additional cost to the Department.

**Basis of Acceptance.** Transverse joint support assemblies will be accepted based on the results of testing as described under TESTS of this specification. The Department requires the submission of Materials Details as defined in §101-02. The supplier shall prepare and submit the appropriate material in accordance with the procedural directives of the Materials Bureau. The supplier shall also provide certification that the elements and assemblies were manufactured in accordance with this specification and the submitted Materials Details. Upon approval by the Materials Bureau, the name of the product and/or the name and address of the reference number and date of the approved Materials Details will be placed on the Approved List.

Transverse joint support assemblies will be accepted at the contract site based on their name(s) appearing on the Approved list, conformance to the approved Materials Details, and the required certifications.

For each contract supplied, the following information shall be provided to the Engineer.

- The supplier shall provide certification that the elements and assemblies were manufactured in accordance with this specification and the approved Materials Details.
- The supplier shall provide certification from the rolling mill as to the type and grade of steel used in the joint support elements.
- The supplier shall provide the following information:
  - The name of the bondbreaker (when applicable) and the name and address of the manufacturer.
  - The type of corrosion protection coating and name and address of the manufacturer.
  - The name and address of the corrosion protection applicator.
  - The name and address of the joint support assembly manufacturer.
  - The correlation between the rolling mill's certification and the supplier's certification.
- Two (2) copies of the approved Materials Details, properly identified by reference number and date as shown on the Approved List.
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705-16 CONCRETE PIPE JOINT SEALING COMPOUND

SCOPE. This specification covers a flexible/rubber sealer used for joints in elliptical pipe, cattle pass and drainage units.

MATERIAL REQUIREMENTS. Concrete pipe joint sealing compound shall conform to the requirements of either AASHTO M198 Type B or ASTM C990.

BASIS OF ACCEPTANCE. Label stating conformance to either AASHTO M198 Type B or ASTM C990. Labels shall be either attached directly to the sealing compound or to the packaging in which the compound arrives at the project site.

705-17 CONCRETE PIPE JOINT ELASTOMERIC GASKETS

SCOPE. This specification covers elastomeric gaskets used for joints in round pipe.

MATERIAL REQUIREMENTS. Concrete pipe joint elastomeric gaskets shall conform to the requirements of either ASTM C443 or ASTM C361.

BASIS OF ACCEPTANCE. Label stating conformance to either ASTM C443 or ASTM C361. Label shall be either stenciled on the elastomeric gaskets, attached directly to the gaskets or attached to the packaging in which the gaskets arrive at the project site.

705-18 THROUGH 705-20 (VACANT)

705-21 MASONRY MORTAR

SCOPE. Requirements for the 3 common types of masonry mortar (N, S and M - increasing in strength, respectively). Use these mortars to bind masonry units together to construct masonry structures, repair masonry structures (tuck pointing), or bed and bond masonry or concrete units together. For historic masonry structures made with soft hydrated lime mortars, use a specially designed lime mortar as shown in the Contract Documents or as approved by the Engineer.

- Type N Masonry Mortar - for tuck pointing repair of structures made with fired clay bricks
- Type S Masonry Mortar - for new structures made with all types of masonry, including brick
- Type M Masonry Mortar - for tuck pointing repair of structures made with masonry other than clay brick
- Type M Masonry Mortar - for new and tuck pointing repair of rigid masonry riding surfaces, such as bridge decks, pavements, sidewalks, and other roadway areas subject to severe weathering and abrasion conditions

MATERIAL REQUIREMENTS

- Portland Cement, Type II or VI §701-01
- Masonry or Mortar Cement, Type N, S or M §701-02
- Blended Portland Cement §701-03
- Mortar Sand §703-03
- Concrete Sand §703-07
- Water §712-01

After adding all ingredients (including water) to a mechanical mixer, mix for 3 to 5 minutes to entrain air and produce a workable and uniform consistency. Discard all unused mortar 2½ hours after initial mixing. Mortar that has stiffened may be re-tempered up to 2½ hours after initial mixing by adding water to restore the original workable consistency.

Use a uniform layer of mortar, 6 to 18 mm thick, for joints between uniform masonry units.
For a tuck pointing (raking out and repointing) mortar, add the minimum water to the dry ingredients to produce a mortar that retains its form when hand squeezed and released. Allow this mortar to stand covered (prehydrate) for 1 to 1½ hours to greatly reduce shrinkage. Then mix with sufficient water to produce a stiff, but workable consistency, and use within 2½ hours of initial mixing.

Avoid re-tempering the mortar when tuck pointing, matching a color, or to avoid color variations between batches (mix smaller quantities, if needed).

No admixtures, except for mortar coloring agents made from light-fast, durable, alkali-resistant minerals, will be permitted without written permission of the Director, Materials Bureau. If colored mortar is specified, submit samples of hardened mortar to the Engineer. Upon approval, use the same, uniform, mortar color throughout the work.

Proportion the N, S or M mortar type by loose volume parts as follows:

<table>
<thead>
<tr>
<th>Mortar Type</th>
<th>Portland or Blended Portland Cement</th>
<th>Masonry or Mortar Cement</th>
<th>Sand</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>0</td>
<td>1 (Type N)</td>
<td>2½ to 3</td>
</tr>
<tr>
<td>S</td>
<td>0</td>
<td>1 (Type S)</td>
<td>2½ to 3</td>
</tr>
<tr>
<td>M</td>
<td>½</td>
<td>1 (Type M)</td>
<td>3½ to 4½</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1 (Type N)</td>
<td>2½ to 3</td>
</tr>
</tbody>
</table>

**BASIS OF ACCEPTANCE.** Inspection and approval by the Engineer.

### §705-22 PORTLAND CEMENT MORTAR BONDING GROUT

**SCOPE.** This specification covers the material requirements for portland cement mortar grout used for bonding fresh concrete to hardened concrete in both vertical and horizontal planes.

**MATERIAL REQUIREMENTS.** The ingredients for the portland cement mortar grout shall comply with the following:

- Portland Cement, Type 1 or Type 2: 701-01
- Mortar Sand: 703-03
- Concrete Sand: 703-07
- Water: 712-01

**Proportioning.** The mortar grout shall have the cement and mortar or concrete sand proportioned 1:1 in separate volumetric containers. The sand shall be deposited into an approved mechanical grout mixer prior to the cement. Both the sand and cement shall be dry mixed for one (1) minute. After dry mixing, water shall be added in sufficient quantity to result in a workable consistency. An additional three (3) minutes of mixing is required after adding desired water. Workable consistency is defined as a grout that will not run on vertical faces or puddle in low spots. Any grout that has dried or become unworkable, as determined by the Engineer, shall not be incorporated in the work. Hand mixing of the mortar may be permitted only for small quantities as approved by the Engineer.

**BASIS OF ACCEPTANCE.** The mortar grout shall be accepted on the basis of inspection and approval by the Engineer.