

711 THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS.
(REV 2-16-06) (FA 2-27-06) (7-06)

SECTION 711 (Pages 753-758) is deleted and the following substituted:

SECTION 711
THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS

711-1 Description.

Apply new thermoplastic traffic stripes and markings, or refurbish existing thermoplastic traffic stripes and markings, in accordance with the Contract Documents.

711-2 Materials.

711-2.1 Thermoplastic: Use only thermoplastic materials listed on the Qualified Products List (QPL). The Engineer will take random samples of all material in accordance with the Department's Sampling, Testing and Reporting Guide schedule.

711-2.1.1 Initial or Recapped Stripes and Markings: Use materials meeting the requirements of 971-1 and 971-5.

711-2.1.2 Refurbishing Existing Stripes and Markings: Use materials meeting the requirements of 971-1 and 971-5, or 971-6 when specifically indicated in the Contract Documents.

711-2.1.3 Preformed Stripes and Markings: Use Materials meeting the requirements of 971-1 and 971-7.

711-2.2 Glass Spheres: Use only glass spheres listed on the Qualified Products List (QPL), meeting the requirements of 971-1 and 971-2. The Engineer will take random samples of all glass spheres in accordance with ASTM D1214 and the Department's Sampling, Testing and Reporting Guide schedule.

711-2.3 Sand: Use materials meeting the requirements of 971-5.4.

711-3 Equipment.

Use equipment capable of providing continuous uniform heating of striping materials to temperatures exceeding 390°F [200°C], mixing and agitation of the material reservoir to provide a homogeneous mixture without segregation. Use equipment that will maintain the striping material in a plastic state, in all mixing and conveying parts, including the line dispensing device until applied. Use equipment which can produce varying width traffic stripes and which meets the following requirements:

(a) capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of striping material and capable of following straight lines and making normal curves in a true arc.

(b) is capable of applying glass spheres to the surface of the completed stripe by a double drop application for initial traffic striping and marking and a single drop application for recapping and refurbishing. The bead dispenser for the first bead drop shall be attached to the striping machine in such a manner that the beads are dispensed closely behind with the thermoplastic material. The second bead dispenser bead shall be attached to the striping machine in such a manner that the beads are dispensed immediately after the first bead drop application. Glass spheres dispensers shall be equipped with an automatic cut-off control that is synchronized

with the cut-off of the thermoplastic material and applies the glass spheres in a manner such that the spheres appear uniform on the entire traffic stripes and markings surface with, 50 to 60% embedment.

(c) equipped with a special kettle for uniformly heating and melting the striping material. The kettle must be equipped with an automatic temperature control device and material thermometer for positive temperature control and to prevent overheating or scorching of the thermoplastic material.

(d) meet the requirements of the National Fire Protection Association, state, and local authorities.

711-4 Application.

711-4.1 General: Remove existing pavement markings such that scars or traces of removed markings will not conflict with new stripes and markings by a method approved by the Engineer.

Before applying traffic stripes and markings, remove any material by a method approved by the Engineer that would adversely affect the bond of the traffic stripes. Before applying traffic stripes to any Portland cement concrete surface, apply a primer, sealer or surface preparation adhesive of the type recommended by the manufacturer. Offset longitudinal lines at least 2 inches [50 mm] from any longitudinal joints of Portland cement concrete pavement.

Apply traffic stripes or markings only to dry surfaces, and when the ambient air and surface temperature is at least 50°F [10°C] and rising for asphalt surfaces and 60°F [16°C] and rising for concrete surfaces

Apply striping to the same tolerances in dimensions and in alignment specified in 710-5. When applying traffic stripes and markings over existing markings, ensure that not more than 2 inches [50 mm] on either end and not more than 1 inch [25 mm] on either side of the existing line is visible.

Apply thermoplastic material to the pavement either by spray, extrusion or other means approved by the Engineer.

Conduct field tests in accordance with FM 5-541 and 5-579. Remove and replace traffic stripes and markings not meeting the requirements of this Section at no additional cost to the Department.

Apply all final pavement markings prior to opening the road to traffic.

711-4.1.1 Preformed Thermoplastic: Apply markings only to dry surfaces and when ambient air temperature is at least 32°F [0°C]. Prior to installation, follow the manufacturer's recommendations for pre-heating.

711-4.2 Thickness:

711-4.2.1 Initial or Recapped Stripes and Markings: Apply or recap traffic stripes or markings such that, before application of drop-on glass spheres, all lane lines, center lines, transverse markings and traffic stripes and markings within traffic wearing areas (such as dotted turning guide lines), will have a thickness of 0.10 to 0.15 inch [2.5 to 4.0 mm] when measured above the pavement surface at the edge of the traffic stripe or marking.

Also, all gore, island, and diagonal stripe markings, bike lane symbols and messages, wherever located, will have a thickness of 0.09 to 0.12 inch [2.3 to 3.0 mm] when measured above the pavement surface at the edge of the traffic stripe or marking.

711-4.2.2 Refurbishing Existing Traffic Strips and Markings: Apply a minimum of 0.06 inch of thermoplastic material. Ensure that the combination of the existing

stripe and the overlay after application of glass spheres, does not exceed the maximum thickness of 0.150 inch [4.0 mm] for all lines.

711-4.3 Retroreflectivity: Apply white and yellow traffic stripes and markings that will attain an initial retroreflectivity of not less than 450 mcd/lx·m² and not less than 350 mcd/lx·m², respectively for all longitudinal lines. All transverse lines, messages and arrows will attain an initial retroreflectivity of not less than 300 mcd/lx·m² and 250 mcd/lx·m² for white and yellow respectively. All pedestrian crosswalks, bike lane symbols or messages in a proposed bike lane shall attain an initial retroreflectivity of not less than 275 mcd/lx·m².

Measure, record and certify on Department approved form and submit to the Engineer, the retroreflectivity of white and yellow pavement markings in accordance with Florida Method FM-5-579.

The Department reserves the right to test the markings within three days of receipt of the Contractor's certification. The test readings should be representative of the Contractor's striping performance. If the retroreflectivity values measure below values shown above, the striping will be removed and reapplied at the Contractor's expense.

711-4.4 Color: Use thermoplastic material that meets the requirements of 971-1.

711-4.5 Glass Spheres:

711-4.5.1 Longitudinal Lines: For initial traffic striping and marking, apply the first drop of Type 4 or larger glass spheres immediately followed by the second drop of Type 1 glass spheres. For refurbishing, apply a single drop of Type 3 glass spheres. Apply reflective glass spheres to all markings at the rates determined by the manufacturer's recommendations.

711-4.5.2 Transverse Stripes and Markings: Apply a single drop of Type 1 glass spheres. Apply reflective glass spheres to all markings at the rates determined by the manufacturer's recommendations.

Apply a mixture consisting of 50% glass spheres and 50% sharp silica sand to all thermoplastic pedestrian crosswalk lines and bike lane symbols at the rates determined by the manufacturer's recommendations.

711-4.5.3 Preformed Markings: These markings are factory supplied with glass spheres and skid resistant material. No additional glass spheres or skid resistant material should be applied during installation.

711-5 Contractor's Responsibility for Notification.

Notify the Engineer prior to the placement of the thermoplastic materials. Furnish the Engineer with the manufacturer's name and LOT numbers of the thermoplastic materials and glass spheres to be used. Ensure that the approved LOT numbers appear on the thermoplastic materials and glass spheres packages. Submit a certified test report to the Engineer indicating that the striping materials meet all requirements specified.

711-6 Protection of Newly Applied Traffic Stripes And Markings.

Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause, at no additional cost to the Department

711-7 Observation Period.

Pavement markings are subject to a 180 day observation period under normal traffic. The observation period shall begin with the satisfactory completion and acceptance of the work.

The pavement markings shall show no signs of failure due to blistering, excessive cracking, chipping, discoloration, poor adhesion to the pavement, loss of reflectivity or vehicular damage. The Department reserves the right to check the color and retroreflectivity within 30 days prior to the end of the observation period.

Replace, at no additional expense to the Department, any pavement markings that do not perform satisfactorily under traffic during the 180 day observation period.

711-8 Corrections for Deficiencies.

Recapping applies to conditions where additional striping material is applied to new or refurbished traffic stripes or markings to correct a deficiency. Recap a 1.0 mile [1.0 kilometer] LOT centered around the deficiency with additional striping material or by complete removal and reapplication at no additional cost to the Department.

If recapping will result in a thickness exceeding the maximum allowed, the traffic stripes or markings will be removed and reapplied.

711-9 Method of Measurement.

The quantities to be paid for under this Section will be as follows:

(a) The net length, in feet [meters], of each of the various types of lines and stripes, authorized and acceptably applied.

(b) The total traversed distance in gross miles [kilometers] of 10-30 skip line. The actual applied line is 25% of the traverse distance for a 1:3 ratio. This equates to 1,320 feet [250 m] of marking per mile [kilometer] of single line.

(c) The length, in net miles [net kilometers], of Solid Traffic Stripe, authorized and acceptably applied.

(d) The area, in square feet [square meters], of Removal of Existing Pavement Markings, acceptably removed.

(e) The number of pavement messages, symbols and directional arrows, authorized and acceptably applied.

711-10 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

Item No. 711	Thermoplastic
	Traffic Stripes, Solid – per net mile.
	Traffic Stripes, Solid – per foot.
	Traffic Stripes, Skip – per gross mile.
	Traffic Stripes, Skip – per foot.
	Dotted/Guideline – per foot.
	Messages –each.
	Arrows – each.
	Yield Markings – per foot.
Item No. 2711	Thermoplastic
	Traffic Stripes, Solid – per net kilometer.

Traffic Stripes, Solid – per meter.

Traffic Stripes, Skip – per gross kilometer.

Traffic Stripes, Skip – per meter.

Dotted/Guideline – per meter.

Messages – each.

Arrows – each.

Yield Markings – per meter.