

SECTION 440

REFLECTORIZED PAINTED PAVEMENT MARKINGS

440.1 GENERAL: This work shall consist of furnishing and installing permanent and temporary reflectorized painted pavement markings in substantial compliance with the specifications and details shown on the plans, at the locations shown on the plans, or as established by the ENGINEER.

440.2 REFERENCES.

440.2.1 Manual on Uniform Traffic Control Devices (MUTCD), Latest Edition

440.3 MATERIALS.

440.3.1 TRAFFIC PAINT: Traffic paint shall conform to the requirements of the NMDOT for White and Yellow Traffic Line Paints Used on Construction Projects (Combination Alkyd and Hypalon - Fast Dry Type).

440.3.2 GLASS BEADS: Glass reflectorizing beads shall conform to the requirements specified in Section 441 for Glass Beads.

440.3.3 TEMPORARY MARKING TAPE

440.3.3.1 Temporary adhesive marking tape shall consist of weather and traffic resistant yellow or white reflective marking material and shall conform to the following requirements:

440.3.3.1.1 DESCRIPTION: The adhesive pavement striping material shall consist of white or yellow reflective marking material on a conformable non-metallic backing coated with a pressure sensitive adhesive and designed for marking of bituminous or portland cement concrete surfaces.

440.3.3.1.2 COLOR: The color of the visible surface shall be either white or yellow in accordance with the MUTCD and shall closely match the color of the paint specified in this Section 440.

440.3.3.1.3 REFLECTANCE: The white and yellow markings shall have the following initial minimum reflectance values at 0.2 degree and 0.5 degree observation angles and 86 degrees entrance angle as measured in accordance with the testing procedure of Federal Test Method Standard 370 unless a higher value is specified on the plans.

TEMPORARY MARKING TAPE			
Minimum Retroreflectivity (Millicandelas Per Footcandle Per Square Foot)			
OA	EA	White	Yellow
0.2	86	1770	1310
0.5	86	1270	820

Where: OA = Observation Angle in Degrees  
EA = Entrance Angle in Degrees

440.3.3.1.4 ADHESION: The material shall have a precoated pressure sensitive adhesive which does not require a liner for protection from contamination, pre-adhesion, or blocking within the roll. Said material shall show no appreciable loss of adhesion after application.

440.3.3.1.5 CONFORMABILITY: The material shall be flexible and formable, shall show no cracking, flaking, or loss of reflective elements and, following application, shall remain conformed to the texture of the pavement surface.

440.3.3.6.1 PHYSICAL PROPERTIES.

440.3.3.1.6.1 DIMENSIONS: The thickness of the adhesive marking tape for normal use, shall not be less than 10 mils and shall be provided in 4-inch or 6-inch width (plus or minus 1/16 inch) unless otherwise specified.

440.3.3.1.6.2 WEAR RESISTANCE: Wear resistance samples of the adhesive pavement striping material applied to standard specimen plates and tested in accordance with Federal Test Methods No. 141, Method 6192, using a CS-17 wheel and 1000 gram load shall not exhibit a significant change in color after 5000 cycles.

440.3.3.1.7 REMOVABILITY

440.3.3.1.7.1 Temporary adhesive pavement striping material shall be readily removable from the pavement by following the manufacturer's recommendations, unless otherwise specified.

440.3.3.1.7.2 Removal shall not require sandblasting, solvent or grinding methods and shall not result in objectionable staining of the pavement surface.

440.3.3.1.8 DURABILITY: The material shall be weather resistant and show no appreciable fading, lifting, or shrinkage.

#### 440.3.3.1.9 GENERAL

440.3.3.1.9.1 The materials as supplied shall be of good appearance and free from cracks, and the edge shall be true, straight, and unbroken.

440.3.3.1.9.2 The adhesive pavement striping material shall be packaged in accordance with accepted commercial standards, shall be stored at temperatures not to exceed 100 degrees Fahrenheit under normal conditions, and shall be suitable for use for a period of at least one (1) year after purchase.

440.3.4 ACCEPTANCE: Acceptance of traffic paint and temporary marking tape will be based upon receipt of certificates of compliance and documentation that the batch of paint and/or marking tape to be used has been tested by an independent laboratory and conforms with specifications.

#### 440.4 CONSTRUCTION REQUIREMENTS.

##### 440.4.1 GENERAL

440.4.1.1 The traffic paint, and beads shall be placed on the pavement by a spray type, self-propelled pavement marking machine, except that temporary striping during construction may be placed with other equipment designed for application of paint, or beads.

440.4.1.1.1 The machine shall be capable of applying a clear-cut 4-inch line or lines.

440.4.1.1.2 The machine shall be equipped with a mechanical device capable of placing a broken reflectorized centerline with a 10-foot painted segment and a 30-foot gap.

440.4.1.1.3.1 The machine shall be equipped with an air-operated glass bead drop-in dispenser controlled by the spray gun mechanism.

440.4.1.1.3.2 The dispenser shall be capable of placing the glass spheres into the paint line as the paint is applied to the pavement in such a manner as to provide satisfactory marking and delineation.

440.4.1.1.4.1 The volume of paint and glass beads in place shall be measured by the quantity per mile method. The CONTRACTOR shall provide certification of the volume of the paint and bead tanks. The CONTRACTOR shall strap the tanks prior to beginning striping operation and again after a mile has been striped. As an alternative, the CONTRACTOR may externally mark the tanks indicating a volume

equivalent to the tolerances shown in this Section 440 or have a calibrated rod marked with the equivalent volumes. The volumes shall be measured after a mile has been striped. At the option of the ENGINEER, if the striping machine is equipped with air atomized spray units, (not airless), and paint and bead gauges, the volume may be determined by utilizing said gauges.

440.4.1.1.4.2 The CONTRACTOR shall be required to restripe the roadway if 50% of the paint or beads is not placed on the roadway or if the ENGINEER determines that the striping is not adhering to the pavement or the glass beads are not adhering to the paint.

440.4.1.1.5 When paint has settled excessively, the CONTRACTOR shall redisperse the settled pigments at the bottom of the paint drums, with a mixing device, prior to pumping or loading paint into the striping unit so excess pigments are not left on the bottom of the paint drum. Thinner shall not be allowed to be pumped into the paint tanks. If the CONTRACTOR uses thinner to clean his equipment, the CONTRACTOR shall be responsible for disposing of all debris including, but not limited to, thinner at disposal sites approved by government agencies regulating the disposal of such materials.

##### 440.4.2 PLACEMENT OF BEADS AND TRAFFIC PAINT.

440.4.2.1 Reflectorized painted markings for temporary use on final surfacing is prohibited. Pavement markings shall be applied during daylight hours when the pavement surface is dry and the weather is not foggy, rainy, excessively windy, or otherwise adverse to the application of markings. The surface shall be free from excess asphalt or other deleterious substances before traffic paint or beads are applied. The CONTRACTOR shall remove dirt, debris, grease, motor oils, rocks, or chips from the pavement surface before applying markings.

440.4.2.2 The CONTRACTOR shall provide the necessary personnel and equipment to divert traffic from the installation area where the work is in progress and during drying time. The CONTRACTOR shall submit a traffic control plan to the ENGINEER for approval prior to the commencement of work. All damage to the pavement marking due to the CONTRACTOR's negligence or failure to maintain traffic control shall be repaired at the CONTRACTOR's expense.

440.4.2.3 Permanent reflectorized painted markings shall consist of two applications of markings. For painted markings on new pavement the second application of markings shall be placed no sooner than

twenty-one days after placement of the first application of markings as directed by the ENGINEER.

440.4.2.4 If paint is not adhering to the pavement or if the glass beads are not adhering to the paint, or if the second application of pavement markings are not placed over the first application of markings in accordance with this Section 440, the CONTRACTOR will be required to remove the striping, and to restripe the roadway.

#### 440.4.3 TOLERANCE FOR PLACING PAINT AND BEADS

440.4.3.1 The finished line shall be smooth, aesthetically acceptable and free from undue waviness.

440.4.3.2 Painted lines shall be 4, 8, or 12 inches wide as shown on the plans with a tolerance of plus or minus 1/8 inch and shall be placed at a minimum rate of 19.75 gallons of paint per mile for a solid 4-inch line and 4.94 gallons per mile for a broken 4-inch line, based on a 10-foot stripe and a 30-foot gap (40-foot cycle). Other widths of striping shall be applied at the minimum rate that is the equivalent multiple of the above.

440.4.3.3 The length of painted segment and gap shall not vary more than six (6) inches in a 40-foot cycle.

440.4.3.4 The following transverse gap dimension between centerline stripes for two (2) and three (3) stripe combinations reflect a three (3) paint gun set up on the striping unit. The broken line shall be placed on the centerline of the roadway with the respective left and right no passing zones placed so a two (2) inch gap exists between the broken and no passing zone stripe. There shall be an eight (8) inch gap between the double yellow markings for no passing zones.

440.4.3.5 Glass reflectorizing beads shall be applied on the wet paint at a minimum rate of six (6) pounds to each gallon of paint. This translates into a minimum weight of beads of 29.6 lbs. per mile of broken line and 118.5 lbs. per mile of solid line.

#### 440.4.4 PLACING TEMPORARY ADHESIVE MARKING TAPE.

440.4.4.1 Adhesive tape marking materials shall be applied as follows:

440.4.4.1.1 The CONTRACTOR shall provide the necessary personnel and equipment to warn and divert traffic during installation and removal from the area where the work is in progress as approved by the ENGINEER. The surface to which the tape is applied

shall be dry and free of oils, grease, dust, dirt and other deleterious substances and shall be primed with a primer material which is recommended by the manufacturer of the tape.

440.4.4.1.2 The tape shall be rolled or tamped down immediately after application until it adheres properly and conforms to the surface of the pavement in accordance with the manufacturer's recommendation.

440.4.4.1.3 Where striping is continuous, there will be no more than 3 splices per 120 feet of length.

#### 440.4.5 REMOVAL OF TEMPORARY PAVEMENT MARKINGS

440.4.5.1 TEMPORARY ADHESIVE MARKING TAPE: All temporary pavement markings placed on the final pavement surface shall be removed by the CONTRACTOR when such temporary pavement markings are no longer required for traffic control as determined by the ENGINEER. Where temporary pavement markings, which are to be removed, consist of adhesive marking tape, the removal shall be complete with no segments or pieces of tape remaining on the pavement. The use of non-reflective black adhesive marking tape to obliterate temporary pavement markings will not be permitted. Overpainting is not an acceptable method.

440.4.5.2 REFLECTORIZED PAINTED MARKINGS: ReflectORIZED painted markings for temporary use on final surfacing is prohibited. ReflectORIZED painted markings when used for temporary pavement markings shall be removed where required by traffic control plan in accordance with the provisions of Section 443 - Pavement Marking Removal.

440.4.6 COMPLIANCE WITH MUTCD: All reflectORIZED painted markings and temporary adhesive marking tape shall conform to the Manual on Uniform Traffic Control Devices (MUTCD).

#### 440.5 MEASUREMENT AND PAYMENT.

440.5.1 ReflectORIZED painted markings will be measured by the linear foot of 4-inch width, complete in place.

440.5.2 Temporary adhesive marking tape will be measured by the linear foot of 4-inch width, complete in place.

440.5.3 Removal of adhesive marking tape will not be measured.

440.5.4 Removal of reflectORIZED painted markings will be measured by the linear foot of 4-inch width, complete in place, in accordance with the provisions of

Section 443 - Pavement Marking Removal.

440.5.5 The accepted quantities of reflectorized painted markings and temporary adhesive marking tape will be paid for at the contract unit price per unit of measurement for each of the pay items as shown on the bid proposal. The removal of reflectorized painted markings will be paid in accordance with the provisions of Section 443 - Pavement Marking Removal.