KANSAS DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION TO THE
STANDARD SPECIFICATIONS, 1990 EDITION

NOTE: This special provision is generally written in the imperative mood. The subject, *"the Contractor"* is implied. Also implied in this language are *"shall"*, *"shall be"*, or similar words and phrases. The word *"will"* generally pertains to decisions or actions of the Kansas Department of Transportation.

Create a new Section in Division 700 as follows:

Division 700

ELASTOMERIC CONCRETE

1.0 DESCRIPTION.

Furnish materials for, and place the elastomeric concrete at the locations shown on the Plans.

2.0 MATERIALS.

Furnish materials that conform to the requirements of Section 1500 of the Standard Specifications (Special Provision 90M-214, latest revision).

3.0 Construction Requirements.

Provide the Project Engineer with a copy of the product manufacturer's instructions for use of this material.

Mix, transport, place and cure the elastomeric concrete as recommended by the material manufacturer.

Assure that a technical representative of the material manufacturer is at the jobsite during the initial placement of the elastomeric concrete. The manufacturer's representative will provide technical expertise regarding the mixing, transporting, placement, and curing of the elastomeric concrete. This requirement may be waived for experienced contractors. Submit your request, along with a list of sucessfully completed elastomeric concrete projects, to the Engineer.

4.0 MEASUREMENT AND PAYMENT.

The Engineer will not measure the elastomeric concrete separately; it will be subsidiary to other items of the Contract.

08-29-97 BD(BS)

Create a new Subsection in Section 1500 as follows:

SECTION 1500

ELASTOMERIC CONCRETE

1.0 DESCRIPTION.

Elastomeric concrete is composed of a two-part rapid curing polymer binder material, aggregate and other ingredients as recommended by the binder manufacturer. Elastomeric concrete exhibits flexibility, suitable load carrying characteristics, ozone resistance, ultra-violet resistance and is not prone to cracking or spalling when exposed to ambient air temperatures of -34 ^{o}C and warmer.

2.0 REQUIREMENTS.

Elastomeric concrete, when combined in the proportions and manner specified by the binder manufacturer, complies with the following physical requirements:

a. Elastomeric binder after seven day cure.

(1) Impact Strength @ -29 ^{o}C	969 g-m, min.
(2) Tensile Strength	3.45 MPa, min.
(3) Ultimate Elongation	100 %, min.
(4) Tear Resistance	36 kg/25mm, min.

b. Elastomeric binder after thirty day oven aging.

(1) Impact Strength @ -29 ^{o}C	969 g-m, min.
(2) Tensile Strength	3.45 MPa, min.
(3) Ultimate Elongation	50 %, min.

c. Elastomeric binder-aggregate mixture after seven day cure.

(1) Bond Strength to Concrete	2.1 MPa, min
(2) Wet Bond Strength to Concrete	1.6 MPa, min
(3) Compressive Stress at 5 % deflection	2.1 MPa min, 13.8 MPa max.

(4) Resilience 70 %, min.

d. Use aggregates which are compatible with the elastomeric binder, as supplied with the system, or as specified by the binder manufacturer.

3.0 METHODS OF TEST:

a. Preparation of Specimens.

Prepare specimens by thoroughly mixing the components in the ratios specified by the manufacturer. Prior to mixing, heat the components to the temperatures recommended by the manufacturer during placement in order to provide a workable mixture and give an initial cure representative of field placement. Apply no heat after mixing. If heating is not specified, mix the components at ambient temperature.

Because of the high bond strength of these materials, mold surfaces such as Teflon or lubricant coated metal are recommended. Binder mixtures should be poured into molds as soon as possible after thorough mixing so they will flow well. Entrained air should be minimized during mixing and may be removed by the use of vacuum, physical means, or passing a soft flame over the surface. Specimens should be allowed to cure sufficiently before removal from molds so that they will not be damaged by removal.

Cure specimens at either 22.7 $\pm$ 2 ^{o}C for seven days or at 60 $\pm$ 3 ^{o}C for thirty days, and test as specified. Specimens for tensile strength, ultimate elongation and tear resistance should be stamped from cast sheets of the proper thickness as soon as the binder is sufficiently cured. Sand these specimens to remove irregularities and provide true surfaces.

b. Tests on the Elastomeric Binder.

(1) Impact Resistance. The specimen is a cast disk 63.5 $\pm$ 1.3 mm in diameter and 9.5 $\pm$ 0.25 mm thick. Sand the faces flat and parallel. After seven days cure, condition the specimens for four hours at -29 ^{o}C. Remove the specimen from the freezer and placed on a dry machined steel plate. Immediately after placing the disk on the plate, drop a 454 g steel ball onto the center of the specimen through a guiding tube from an initial drop height of 1.5 meters. The drop height is increased by 150 mm intervals until the specimen cracks, or until all specimens exceed the specification minimums. The result will be the average of four specimens. Any cracking of a specimen will constitute failure. Repeat the procedure with four specimens which have been oven cured for thirty days.

(2) Tensile Strength. This test is performed according to ASTM D 638 using the Type IV specimen with dimension WO of 25 mm, which corresponds to Die C of ASTM D 412. Perform Testing after seven days of cure. Measure the thickness and width of the specimen neck using a dial gauge or caliper, and determine the cross sectional area. Use an initial test machine jaw separation of 50 mm, and a crosshead speed of 50 mm per minute. Load the specimen to failure. Use the maximum load to determine the tensile strength. Test at least eight specimens. Discard those with obvious flaws. Repeat the procedure with eight specimens which have been oven cured for thirty days.

(3) Ultimate Elongation. Perform this test as a part of *Tensile Strength* using the same specimens. Determine ultimate elongation from the initial jaw separation and the amount of crosshead travel at failure. Report results as a percent of the original gauge length. Repeat the procedure with eight specimens which have been oven cured for thirty days.

(4) Tear Resistance. Determine tear resistance according to ASTM D 624 using the Die C specimen. Perform testing after seven days cure. Determine the thickness of the specimen at the point of tear with a dial gauge prior to testing. Use an initial testing machine jaw separation of 50 mm, and a crosshead speed of 50 mm per minute. Test a minimum of five specimens.

c. Tests on the Elastomeric Binder-Aggregate Mixture.

(1) Bond Strength to Concrete. Cast the elastomeric concrete against a mortar briquette half (briquette conforms to AASHTO T 132). Saw the briquette in half so that the sawed surface area equals approximately 625 mm^2. Sand blast the surface. Place the briquette in the mold and cast the elastomeric concrete against the sawed surface. Cure the specimens seven days in air at 22.8 $\pm$ 2 ^oC. Using the Riehle briquette tester, specimen failure is considered to occur at either the bond interface or in either of the two materials. Test a minimum of four specimens. Determine an average tensile breaking stress based on a 625 mm^2 cross-sectional area.

(2) Wet Bond Strength to Concrete. Prepare mortar briquette halves the same as for Bond Stength to Concrete. After a five day cure in air at 22.8 $\pm$ 2 ^oC, immerse the specimens in 22.8 $\pm$ 2 ^oC water for two days in a horizontal position. After the immersion period, remove the specimens from the water and subject them to tensile testing with the Riehle briquette tester while still damp. Test a minimum of four specimens. Determine an average tensile breaking stress based on a one-square inch cross-sectional area.

(3) Compressive Stress at 5 % Deflection. The test specimens are cast 50 mm cubes, prepared so as to have flat, parallel opposing faces free from irregularities. Cure the specimens seven days in air at 22.8 $\pm$ 2 ^oC. Determine the original thickness of the specimen within 25 μm without a load. Place the specimen in the compression machine, apply a 45 kg load, and zero a dial gauge. Load the specimen at a rate of 3.8 mm per minute until a deflection of 2.5 mm is reached, at which point the compressive load is recorded and removed. Test a minimum of four cubes and calculate an average compressive stress based on the original 2500 square millimeter area.

(4) Resilience. The Resilience test is a continuation of the Compressive Stress at 5 % Deflection test. After removal of the load, the specimen is allowed to recover for five minutes, after which the thickness is remeasured. Resilience is the percent recovery and is calculated as follows:

$$\frac{(2.3 \text{ mm.} + \text{final thickness} - \text{initial thickness}) \times (100)}{(2.5 \text{ mm})}$$

4.0 PREQUALIFICATION.

a. Manufacturers interested in prequalifying material under this specification must provide three sets of two component samples (two for binder tests, and one for binder-aggregate mixture tests) to the Engineer of Tests for laboratory testing. Provide one set of aggregate for binder-aggregate mixture testing. Also include a copy of the quality control test report for the batch

of material the sample represents, material safety data sheets, and a complete set of mixing and installation recommendations and instructions.

b. The material will be evaluated for compliance with all requirements of this specification, and the manufacturer will be notified of the results. A list of qualified materials will be maintained by the Bureau of Materials and Research. Products will remain on the prequalified list as long as the results of verification testing and field performance are
satisfactory. Any changes in formulation should be reported to the Engineer of Tests for review and evaluation to determine if requalification is necessary.

5.0 BASIS OF ACCEPTANCE.

a. Prequalification as required by paragraph 4.0.

b. Receipt and approval of a Type C certification in accordance with Section 2600.

c. Visual observation of performance in the field.

04-08-96 M&R (JLC)

054060000	ELASTOMERIC CONCRETE	kg	90M-214-R*	PRCT