SPECIAL PROVISION TO ITEM 205.2H
GROUND RECYCLED TIRE RUBBER MODIFIED ASPHALT BINDER

Revised: September 24, 2010

Description. This work shall consist of constructing Hot Mix Asphalt (HMAC) mixtures containing Ground Recycled Tire Rubber (GTR) modified asphalt binder. Work shall be according to City of San Antonio (COSA) Standard Specifications, except as modified herein.

Materials. Binder materials shall be according to COSA Standard Specifications, except as modified herein.

(A) Bituminous Material. The base asphalt binder shall be performance-graded (PG) binder meeting or exceeding PG 64-22.

(B) Ground Recycled Tire Rubber. The GTR shall be produced from processing automobile and/or light truck tires by the ambient grinding method. Heavy equipment tires, uncured or de-vulcanized rubber will not be permitted. The GTR shall not exceed 2 mm (1/16 in.) in any dimension and shall contain no free metal particles or other foreign contaminating materials. Detection of free metal particles shall be determined by thoroughly passing a magnet through a 50 gram sample. Metal embedded in rubber particles will be permitted.

The GTR shall be stored in a dry location protected from the rain. The GTR shall have a maximum of 0.75% moisture by weight and shall be free flowing. When the GTR is combined with the asphalt cement, the moisture content of the GTR shall not cause foaming of the blend.

When tested in accordance to AASHTO T-27, *Sieve Analysis of Fine and Coarse Aggregates a* 50 gram sample of the GTR shall conform to the following gradation requirements:

Sieve Size	Percent Passing
2.36 mm (No. 8)	100
1.18 mm (No. 16)	98 ± 2
600 µm (No. 30)	95 ± 5
300 µm (No. 50)	> 20

A mineral powder (such as talc) meeting AASHTO M17, *Mineral Filler for Bituminous Paving Mixtures*, requirements may be added, up to a maximum of 4% by weight of GTR particles, to reduce sticking and caking of the GTR particles.

GTR shall have a specific gravity of 1.150 ± 0.050 when tested in accordance with ASTM D-1817, *Standard Test Method for Rubber Chemicals-Density.*

The GTR may be provided in bulk or in whole plastic containers. Plastic containers shall be made from low density polyethylene having a melting point

less than 240° F. The manufacturer shall ship along with the GTR, certificates of compliance which certify that all requirements of this specification are complied with for each production lot number or shipment.

(C) Polymer Additions. With approval of the Engineer, compatible polymers may be added to the GTR or to the asphalt-rubber blend during the process of blending and reaction of the asphalt binder with the GTR. The additional costs for the polymer additions shall be borne by the asphalt binder Supplier or the Contractor. The asphalt binder Supplier or the Contractor shall provide material product information along with usage rates for approval.

Preparation of GTR Modified Asphalt Binder. The GTR shall be blended with the PG-graded base asphalt binder, forming a consistent, homogeneous blend, using the Terminal Blend method, where the GTR is blended and reacted with the asphalt binder at the asphalt production facility. The asphalt-rubber blend shall consist of a minimum of 10% GTR (by dry unit weight of asphalt binder).

(A) Blending Requirements

(1) A separate agitated shipping / storage tank, with continuous mixing and recirculation of the asphalt-rubber blend, shall be required to react the GTR with the asphalt binder and to maintain the homogeneous blend of asphalt binder and GTR. This tank shall be heated and capable of maintaining the temperature of the homogeneous blend of asphalt binder and GTR at 325°F to 375°F (163°C to 191°C). The GTR shall be reacted with the asphalt binder for a minimum of 6 hours at a temperature of 325°F to 375°F.

(2) Terminal blended GTR asphalt binder may be stored at 300°F to 350°F with continuous mixing and/or recirculation, to maintain the homogeneous blend. Full Specification Compliance testing shall be repeated every 30 days on previously certified material held in storage.

(3) A dedicated storage tank for "terminal blended GTR asphalt binder" shall be provided at the HMAC plant. This tank must be capable of providing continuous mixing and/or recirculation of the GTR asphalt binder. This tank shall be heated and capable of maintaining the temperature of the homogeneous blend of asphalt binder and GTR at 300°F to 350°F. The maximum storage time of the GTR asphalt binder at the HMAC plant shall be 3 days maximum, unless approved by the Engineer.

(B) Asphalt-rubber Blend Characteristics. Asphalt-rubber blend must be homogeneous, but may contain visible particles of tire rubber.

GTR Modified Binder Compliance Testing. When the asphalt binder and GTR have reacted and form a homogeneous blend, test samples shall be obtained and submitted for testing. COSA personnel may also collect samples at any time. The GTR asphalt binder shall meet the requirements shown in Table 1.

Table 1. Requirements for GTR Asphalt Binder		
Test	**Value**	**Test Method**
Flash Point, Min, °C	230	T 48
Viscosity, Max, 3.0 Pa· s, temperature, °C	135	T 316
Softening Point, ° F, min.	135	T 53
Elastic Recovery @77°F, (25°C), 100mm elongation, 5cm/min., cut immediately, % min.	65	ASTM D6084 Procedure A

(A) The supplier of the GTR asphalt binder shall certify and provide the following documentation:

(1) Certificate of Analysis with the accompanying Producer's Sequence Number of the base asphalt binder.

(2) The composition of the GTR.

(3) The material product information and usage rates for any polymer additions, and

(4) The characteristics and test results of the final GTR asphalt binder.

(B) The final GTR asphalt binder shall be referred to using the PG grade of the base asphalt binder, GTR, and the minimum percent of GTR required (example: 64-22 GTR 10).

HMAC Mixture Design. The mixture design shall be according to COSA Standard Specifications.