

## **SECTION 336 ASPHALT RUBBER BINDER**

### **336-1 Description.**

Produce asphalt rubber binder for use in Asphaltic Concrete Friction Courses and Asphalt Rubber Membrane Interlayers.

### **336-2 Materials.**

**336-2.1 Asphalt Cement:** For the particular grade of asphalt cement as specified in Table 336-1, meet the requirements of Section 916.

**336-2.2 Ground Tire Rubber:** For the type of ground tire rubber, meet the requirements of Section 919.

### **336-3 Asphalt Rubber Binder.**

Thoroughly mix and react the asphalt cement and ground tire rubber in accordance with the requirements of Table 336-1. Use a rubber type that is in accordance with the verified mix design. Accomplish blending of the asphalt cement and ground tire rubber at the asphalt supplier's terminal or at the project site.

### **336-4 Equipment.**

Use blending equipment that is designed for asphalt rubber binder and capable of producing a homogeneous mixture of ground tire rubber and asphalt cement meeting the requirements of Table 336-1. The Contractor may use a batch type or continuous type blending unit that provides for sampling of the blended and reacted asphalt rubber binder material during normal production. Once every six months, certify the accuracy of the meter used to determine the asphalt rubber binder content of bituminous mixtures. Obtain such certification from an approved scale technician.

In order to meet specification requirements, keep the asphalt rubber uniformly blended while in storage. Equip storage tanks with a sampling device.

### **336-5 Testing and Certification Requirements.**

**336-5.1 Blending at Project Site:** The Engineer will monitor the ground tire rubber content in the asphalt rubber binder on a daily basis based on the following:

(1) the weight of the ground tire rubber used and the gallons [liters] of asphalt rubber binder used, or (2) the weight of the ground tire rubber used and the number of gallons [liters] of asphalt cement used. The Engineer will use the weight per gallon [liter] for the various types of asphalt rubber binder shown in Table 336-1 for the calculations in (1) above.

**336-5.2 Blending at Asphalt Supplier's Terminal:** Where blending the asphalt rubber binder at the asphalt supplier's terminal, certify that for each load delivered to the project site, the asphalt rubber binder has been produced in accordance with and meets the requirements of 336-3. In addition, include, with the certification, the certifications for the asphalt cement and ground tire rubber, as specified in 916-1.2 and 919-6, respectively.

#### **336-5.3 Testing of Asphalt Rubber Binder:**

**336-5.3.1 Quality Control Requirements:** Test the asphalt rubber binder for the viscosity requirement of Table 336-1 at the following frequencies and situations:

1. One per batch (for batch blending) or two per day (for continuous blending) during blending at the project site.
2. Each load delivered to the project site when blended at the asphalt supplier's terminal.

3. Beginning of each day from the storage tank when storing the asphalt rubber binder at the project site.

Obtain the viscosity testing equipment specified in FM 5-548 and make it available to the Department for acceptance purposes.

In the event that the Quality Control and Acceptance samples are being tested simultaneously, the Contractor may use the Acceptance Test results for quality control.

**336-5.3.2 Acceptance Requirements:** The Engineer will test the asphalt rubber in accordance with FM 5-548 to ensure conformance with the minimum viscosity requirement as specified in Table 336-1 at the following specific frequencies and situations:

1. One per batch (for batch blending) or two per day (for continuous blending) during blending at the project site.

2. Beginning of each day from the storage tank when storing the asphalt rubber binder at the project site.

If the asphalt rubber binder does not meet the minimum viscosity requirement, make the appropriate adjustments in order to (1) correct the viscosity of the blended material, and (2) correct the blending operation. These corrective actions may include increasing the ground tire rubber content, lowering the blended temperature, or increasing the reaction time. In the event that the corrective actions taken fail to correct the problem, or the material consistently fails to meet the minimum viscosity requirement, stop all asphalt rubber production operations and solve the problem. Do not resume production operations until the Engineer grants approval. The Engineer will evaluate any mix placed with low viscosity asphalt rubber binder to determine if the Contractor should remove and replace it. In the event that the viscosity of the asphalt rubber binder increases to the extent that paving operations of the mixture are adversely affected (i.e. density or texture problems occur), stop plant operations and resolve the problem.

Table 336-1			
Asphalt Rubber Binder			
Binder Type	ARB 5	ARB 12	ARB 20
Rubber Type	TYPE A (or B)*	TYPE B (or A)**	TYPE C (or B or A)**
Minimum Ground Tire Rubber (by weight of asphalt cement)	5%	12%	20%
AC Grade	AC 30	AC 30	AC 20
Minimum Temperature	300°F [150°C]	300°F [150°C]	335°F [170°C]
Maximum Temperature	335°F [170°C]	350°F [175°C]	375°F [190°C]
Minimum Reaction Time	10 minutes	15 minutes (Type B)	30 minutes (Type C)
Unit Weight @ 60°F [15°C ***]	8.6 lbs/gal [1.03 kg/L]	8.7 lbs/gal [1.04 kg/L]	8.8 lbs/gal [1.05 kg/L]
Minimum Viscosity ****	4.0 Poise @ 300°F [0.4 Pa·s @ 150°C]	10.0 Poise @ 300°F [1.0 Pa·s @ 150°C]	15.0 Poise @ 350°F [1.5 Pa·s @ 175°C]
<p>* Use of Type B rubber may require an increase in the mix temperature in order to offset higher viscosity values.  ** Use of finer rubber could result in the reduction of the minimum reaction time.  *** Conversions to standard 60°F [15°C] are as specified in 300-8.3.  **** FM 5-548, Viscosity of Asphalt Rubber Binder by use of the Rotational Viscometer.  NOTE: The Contractor may adjust the minimum reaction time if approved by the Engineer depending upon the temperature, size of the ground tire rubber and viscosity measurement determined from the asphalt rubber binder material prior to or during production. Apply the asphalt rubber binder for use in membrane interlayers within a period of six hours, unless some form of</p>			

corrective action such as cooling and reheating is approved by the Engineer.

**336-6 Use of Excess Asphalt Rubber.**

The Contractor may use excess asphalt rubber in other asphaltic concrete mixtures requiring the use of an AC-30 by blending with straight AC-30 so that the total amount of ground tire rubber in the binder is less than 2.0%. The Contractor may use excess asphalt rubber in asphaltic concrete mixtures requiring the use of a recycling agent in a recycled mixture by blending with a recycling agent in such proportions that the total amount of ground tire rubber in the recycling agent is less than 1.0%.

**336-7 Basis of Payment.**

Payment for Asphalt Rubber Binder will be included in Sections 337 and 341, as appropriate.