TECHNICAL DATA

ASPHALT PLUS^{R} PRODUCT SAMPLE TESTING GUIDANCE
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INTRODUCTION

Asphalt Plus products support the addition of crumb rubber to hot and warm mix asphalt at the mix producer's plant. Using what is called a "Plant Mix Process," crumb rubber is added during the asphalt mix manufacturing process. Unlike standard crumb rubber, Asphalt Plus crumb rubber is engineered in order to help produce an asphalt mix design that meets or exceeds pavement performance characteristics desired by the road owner. The finished, mixed asphalt product is an asphalt/rubber/aggregate/additive composite rather than a mixture of asphalt with "digested" rubber as a part of the liquid addition to the mix design. As such, binder testing of composites is best done with mix testing rather than with modified binder testing. Some specifying agencies still wish to use binder testing. If they wish to test crumb rubber modified binders, this guidance has been prepared for those potential users.

The process for designing and testing any particular mix design is straightforward. An additive design is created in consultation with the asphalt producer. Admixtures are designed by A+ and samples of the admixtures are forwarded to a testing laboratory. Once at the lab, it is important to understand that the sample preparation process must be designed to simulate material heating, handling and residence times associated with asphalt plant operations and field placement of the product. A failure to handle asphalt mix samples properly will result in the production of samples that will not represent materials produced by the asphalt plant, and improper sample preparation and handling will likely under-represent that durability of Asphalt Plus pavements.

SAMPLE SIZE

In order to produce representative materials, it is important to maintain sample temperatures so that they mimic the temperature stability of a large mass of heated materials; a condition characteristic of asphalt production operations. Use of larger samples – at least twice the size of the materials required for testing – is recommended in order to maintain a more conservative temperature profile during testing.

MIX DESIGN SELECTION AND MATERIALS PREPARATION

Select the asphalt mix design that will require testing. In consultation with A+, determine the proper ratios of aggregate, asphalt binder, and Asphalt Plus additives. Obtain a properly formulated and mixed sample of Asphalt Plus crumb rubber from A+. Set the proportions of aggregate and asphalt binder aside for heating. Make sure that the proportions are weighed correctly, and make sure that the sample size is at least double the

volume of the actual testing requirements for material. Preheat the aggregate to within a range of 360 to 400 Deg. F. Preheat the selected asphalt binder (PG58-, 64-, 67-, etc) to 320 Deg F. Preheat the sample molds to 320 Deg F. Finally, preheat an oven to 335 Deg F for sample storage immediately after mixing.

SAMPLE PREPARATION

Place the preheated aggregate in the mixing bucket and make an indentation in the stone into which you add the Asphalt Plus admixture supplied to you by A+. Immediately stir the mix for a minimum of 90 seconds (A shearing mechanical mixer is strongly recommended). This mixing process is designed to simulate the minimum time, motion and mixing of the material transport and initial introduction to the pug mill at an asphalt production facility. Immediately following dry mixing, the preheated asphalt binder should be added to the dry materials, and the combined binder, aggregate and Asphalt Plus materials should be mixed for a minimum of two additional minutes (A shearing mechanical mixer is strongly recommended). A failure to properly and aggressively mix the binder, additives and aggregate together before mold placement will very likely result in an unacceptably low-quality asphalt mix that will not reflect plant output.

Immediately after mixing, the combined asphalt sample should be placed in a preheated 335 Deg F oven and should be allowed to sit in the oven for an additional two hours. This two-hour "aging time" represents the expected time between initial mixing and application to a road surface.

At the completion of the two hour period in the oven, allow the mix to cool to 320 Deg F. Stir the mix again in order to evenly distribute all of the aggregate particles and then draw materials from the sample mass in order to make gyrocompactor pills (the prescribed number of blows will depend on the ESALs required of the mix). In order to prepare sample molds, transfer the prepared mix to the preheated molds. While transferring the prepared sample material from the mixing container to the molds, take extra care to get all – especially the smallest – particles transferred into the molds, or desired densities may not be achieved. **It is important to keep the compacted mix in the mold for 30 minutes during sample cooling on order to allow the final mechanical transactions to take place, preferably under a fan to facilitate cooling. Left uncovered, the sample will swell somewhat in size. Covering the mold with a weighted metal plate or similar device to keep the product in the mold is recommended.**

Once the sample has cooled for approximately 30 minutes, the rubber additives will help in freeing the product from the mold.

NOTE: These procedures, based on our experiences, are proven to more closely mimic full scale production mixing dynamics.

If you require any technical assistance, please call Asphalt Plus, LLC at 847-639-1176 before initial blending.