



Asphalt Rubber Italia

Asphalt Rubber/ Rubberized Asphalt **There Is a Difference!**

Crumb rubber has been used to modify asphalt for thirty years. Crumb rubber is derived from recycled scrap tires. Crumb rubber is the major component of Asphalt-Rubber (AR), also called the "Wet" process. This ingredient provides A-R its exceptional characteristics. However, some confusion still exists regarding the term Asphalt-Rubber.

With the growing number of successful and aged Asphalt-Rubber (AR) projects in place that have required very little or no maintenance over the years, the claims of AR's superior performance is hard to ignore. The proof is in the pavement.

Because of this proof, many different paving processes that use rubber in some form make the claim to be Asphalt-Rubber or an equal to Asphalt-Rubber. Many of these processes are called "Rubberized Asphalt" and contain synthetic rubber materials or recycled rubber from another source such as tennis balls. The process most often confused with AR is the "Dry" process that has been marketed under a variety of names such as "Plus Ride". For the benefit of our readers, this document was prepared to illustrate the differences between Asphalt-Rubber ("Wet" process) and the "Dry" process.

The "Wet" Process

The **"wet" process is called "Asphalt-Rubber"**. It has been defined in the **ASTM D 6114** Standard Definitions of Terms Relating to Materials for Roads and Pavements as:

"A blend of asphalt cement, reclaimed tire rubber, and certain additives in which the rubber component is at least 15% by weight of the total blend and has reacted in the hot asphalt cement sufficiently to cause swelling of the rubber particles."

There are slight formulation distinctions within the Asphalt-Rubber blends, depending on application and climatic zones.

The manufacture of Asphalt-Rubber consists of ground recycled rubber mixed, in a specialized blending unit, with liquid paving grade asphalt and heated to 375° to 400° F, to produce a thick, fluid binder. The binder is pumped from the blender to a distributor equipped with heat and an auger, where a "reaction" takes place. The reacted Asphalt-Rubber is pumped directly into the pug mill or drum mixer and mixed with the aggregate.

The ultraviolet inhibitors, anti-oxidants and other chemicals in the ground scrap tire rubber are transferred to the asphalt, giving the reacted Asphalt-Rubber material greater age and crack resistance which contributes to longer pavement life.

In the spray applied method, the two most common are the A-R Stress Absorbing Membrane (SAM) and Stress Absorbing Membrane Interlayer (SAMI). In both procedures the binder is spread by the distributor and covered by a hot, pre-coated aggregate.

In the hot plant process, the material is known as "Asphalt-Rubber Hot Mix (ARHM). The ARHM is placed as a surface course with conventional paving equipment. Varying mix designs are utilized with the ARHM, Gap Graded being the most commonly used in Southern California and the Open Graded in Arizona.

The spray applied "membrane" application processes recycle the equivalent of approximately 700 recycled scrap tires per lane mile (a 12' x 5,280' section of pavement). A one-inch thick application of Asphalt-Rubber Hot Mix (ARHM) process uses the equivalent of approximately 1,250 recycled tires per lane mile.

The "wet" process, used for nearly 30 years, has been researched and tested extensively by agencies on four continents since it was developed in the sixties. It has been used in 45 states and adopted for routine usage in 10 foreign countries.

The "Dry" Process

The "dry" process of utilizing crumb rubber in hot mix encompasses several different methods, all of which have a common characteristic of being an additive to the aggregate.

In the "dry" processes, crumb rubber in solid form is added as a substitute for up to 5 percent of the aggregate in the asphalt mix. The paving grade asphalt is the same as for conventional mixes. However, higher mixing temperatures (usually between 320° and 370° F) and higher compaction temperatures (300° to 320° F) are required. No specialized equipment or significant plant modifications are required for the manufacture or applications of the material. Unlike Asphalt-Rubber, little, if any, reaction takes place between the rubber and asphalt particles. The lack of this reaction leaves the asphalt in the "dry" process unmodified and does not allow the release of the ultraviolet inhibitors and anti-oxidants contained in the scrap tire rubber. After a lengthy study, the Florida DOT opted not to develop State Specifications for the "dry" process for this reason.

The rubber modified asphalt concrete pavements produced by the "dry" process have generally been used as overlays and surface wearing courses. It has been marketed as having good skid resistance and de-icing properties. For these reasons it was of some interest in cold regions such as Alaska. The most widely known "dry" process product was called "PlusRide" a proprietary product developed in Sweden. The State of Alaska petitioned the FHWA to remove PlusRide from experimental status in the nineties, but the petition was denied for the lack of sufficient supporting data. PlusRide and two lesser known materials were tested by CalTrans but were never recommended for routine use.

The Oregon State University led "Pooled Fund Study" on crumb rubber modified asphalts commissioned by the FHWA and several states in 1995 considered the investigation of both the "wet" and "dry" processes. However, only the "wet" process material was studied due to the lack of successful "dry" process projects throughout the nation.

Currently, some "dry" processes are being marketed in California and other states as an equal to Asphalt-Rubber but have yet to meet the "time tested and proven" standards achieved by the "wet" process.