

904 BITUMINOUS EQUIPMENT**904.01 BITUMINOUS MIXING PLANTS**

- (A) **GENERAL.** Plants used for the preparation of hot mix bituminous mixtures shall be a batch, continuous or drum type. The plant shall be approved prior to use and conform to the appropriate sections of AASHTO M 156.

The plant shall be of sufficient capacity to adequately handle the proposed construction and be maintained in good mechanical condition. Any defects that adversely affect the proper function of the plant or the quality of the mixture shall be repaired immediately.

The plant shall be equipped with all necessary scales, measures and weighing devices to insure proper proportioning of all ingredients and shall be so designed, coordinated and operated to produce a mixture within the job mix tolerances. Testing and checking these weighing devices and meters shall be done in the presence of the Chief Engineer.

The plant shall be equipped with a laboratory in accordance with [106.06](#).

All moving parts, pulleys, belts and drive mechanisms shall be covered or otherwise protected. Stairways and platforms shall be unobstructed and have secure handrails. Particles shall be controlled within the requirements of Environmental Protection Agency. Dust collectors are required. Bag-house fines, when used, shall be re-circulated to the mineral filler bin.

- (B) **SCREENING.** In batch plants, the aggregates, immediately after heating, shall be screened into 3 or more fractions and conveyed into separate compartments. In any compartment there shall be not more than 5 percent of the aggregate larger than the screen controlling the top size of the material nor more than 20 percent smaller than the screen size controlling the smallest material for the particular separation. When continuous mixing plants are used, a minimum of three aggregate cold feed bins shall be used to proportion aggregates to obtain the specified gradation.

- (C) **SURGE AND STORAGE BINS.** The Contractor may elect to store hot mixed bituminous concrete in a surge or storage bin provided said bin has received prior evaluation and approval by the Chief Engineer. Use of the bin is to be in conformance with all limitations on retention time, type of mixture, heater operation, bin atmosphere, bin level or other characteristics set forth in the applicable specifications. Affixed to each bin and visible from the Inspector's office and to the loading operator shall be an indicator device that will be activated when the material in the bin drops below the top of the sloped portion of the bin.

An evaluation of a surge or storage unit will determine the degree of composition uniformity, temperature characteristics and the degree of asphalt cement hardening of mixture processed through the surge or storage unit. Approval will be granted for bin usage that consistently results in mixtures having gradation and temperature properties of no less quality than specified mixtures discharged directly from the plant's mixing operation and resulting in asphalt hardening properties which do not exceed the limits specified below. Materials for use as open graded coarse material should not be stored

because of the likelihood of asphalt migration. Mixtures that the Chief Engineer determines visually to be segregated will be rejected.

Asphalt hardening due to storage shall not exceed 10 per cent of the original values determined from the asphalt prior to mixing.

Original asphalt properties shall be determined from samples of asphalt taken prior to incorporation into the mix. Test procedures shall be in accordance with AASHTO M 20 or M 226, whichever is applicable as determined by the Chief Engineer.

The amount of hardening due to storage shall be determined by comparison of tests on samples of the mixtures taken after exit from the pug mill or drum but before entry into the storage bin and before samples are taken after exit from the storage bin.

When asphalt hardening, due to mixing, exceeds the amount allowed for original asphalt by AASHTO M 20 or M 226, whichever is applicable, use of a bin for other than as a surge bin will not be permitted unless storage can be determined to have no significant effect on asphalt hardening.

Recovery of asphalt from the mixture shall be in accordance with AASHTO T 164 and T 170.

The system shall be capable of conveying the hot mix from the plant to the storage bins and storing the hot-mix without a loss in temperature, segregation of the mix or oxidation of the mix.

Storage and surge bins shall be designed in such a manner as to prevent segregation of the hot-mix during discharge from the conveyor into the bins and shall be equipped with discharge gates that will not cause segregation of the hot- mix while loading the mix into the trucks.

904.02 TRUCKS FOR TRANSPORTING BITUMINOUS MIXTURES

Trucks for transporting bituminous mixtures shall have a solid metal, dump type bed. The bed shall be free of debris, clean, smooth and have a tight fitting rear gate to prevent loss of materials while in transit.

The inside surface of the bed shall be sprayed with an approved material shall be used to prevent the mix from adhering to the beds. Petroleum derivatives or other coating material that contaminate or alter the characteristics of the mix will not be approved nor will excessive quantities of approved oil be permitted.

Each truck shall be equipped with a canvas or other suitable material of sufficient size to cover the material and protect it from the weather. When necessary to maintain temperature, the truck bodies shall be insulated to prevent temperature loss while in transit. The trucks shall not have appreciable oil leakage that may cause damage to the new bituminous construction.

A hole 1/4 to 1/2 inch in diameter shall be provided in the truck bed at an appropriate height to facilitate the insertion of an asphalt thermometer.

All trucks shall be equipped with a back-up alarm meeting D.C. safety code.

904.03 PRESSURE DISTRIBUTORS

Distributors used for the application of bituminous materials shall be of the pressure type mounted on trucks or semi-trailers equipped with pneumatic tires. The tires shall have sufficient width of rubber in contact with the prepared road surface to avoid breaking the bond or forming a rut in the surface. The rear axles of semi-trailer units shall be mounted on dual wheels.

The distributor shall be equipped with a suitable means to provide a uniform temperature of the entire mass of material. The heating unit shall be designed to heat the bituminous material without burning or overheating any portion and with effective and positive control of the heat at all times. The distributor shall be provided with at least one thermometer that shall be maintained in good condition at all times and placed to register accurately the temperature of the tank content.

The distributor shall be constructed and operated to be capable of evenly and uniformly applying accurately measured quantities from 0.05 to 1 gallon of bituminous material per square yard of surface. The specified rate of application shall be maintained during the distribution of the entire load regardless of change in grade or direction.

The spray bar and nozzle shall be of such size to insure uniform distribution of the material in specified quantities, and the nozzles shall be designed to issue a fan-shaped spray without streaks or bare spots. A strainer shall be provided in the discharge line to prevent the nozzles from becoming clogged.

The distributor shall be equipped with a tachometer that will show the speed in feet per minute. It shall be located as to be easily visible to the truck driver to enable him to maintain the constant speed necessary for the correct application of the specified quantity of material.

A pressure gauge shall be provided to indicate accurately the pressure at which the bituminous material is applied. If an air-pressure type distributor is used, the air relief valve shall be discharging at all times during the distributing operations. All distributors, except those of the air-pressure type, shall be equipped with auxiliary motors for pumping material to the spray bars.

The distributor shall be designed so that the application of bituminous material can be started and stopped instantly at all nozzles without dribbling and without the driver leaving his seat. It shall have sufficient pressure to provide a spray that will cover completely and uniformly the entire surface receiving the application.

A hand spray bar and nozzle attachment capable of operating under the required pressure and that can be gaged shall be provided with the distributor. It shall consist of a suitable length of flexible steel hose with packed couplings and will be used for touching up spots inaccessible to or unavoidably missed by the distributor.

904.04 BITUMINOUS PAVERS

Bituminous pavers shall be self-contained, power-propelled units, provided with an activated screed or strike-off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the specified typical section and thicknesses shown on the plans. The pavers shall be equipped with

adjustments of the manufacturer's standard design that will permit the bituminous material to be spread and finished in widths shown on the plans. The machine shall be capable of placing a minimum width of 8 feet.

The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The paver shall be equipped with automatic feed controls, properly adjusted to maintain a uniform depth of material ahead of the screed.

The screed or strike off assembly shall effectively produce a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture.

When laying mixtures, the paver shall be capable of being operated at forward speeds consistent with satisfactory laying of the mixture.

All pavers shall be equipped with automatic screed controls with sensors for either or both sides of the paver, capable of sensing grade from an outside reference line, sensing the transverse slope of the screed and providing the automatic signals that operate the screed to maintain the desired grade and transverse slope. The sensor shall be constructed to operate from a reference line or a ski-like arrangement.

The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1 percent.

Manual operation may be permitted by the Chief Engineer for the construction of irregularly shaped small areas.

Whenever a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually or by other methods for the remainder of the normal working day on which the breakdown or malfunction occurred provided this method of operation will produce results meeting specifications.

Reference lines will be required for both outer edges of the traveled way for each main line roadway for vertical control. Horizontal control utilizing the reference line will be permitted. The grade and slope for intermediate lanes shall be controlled automatically from reference lines or by means of a ski and a slope control device or a dual ski arrangement. When the finish of the grade prepared for paving is superior to the established tolerance and when, in the opinion of the Chief Engineer, further improvement to the line, grade, cross sections, and smoothness can best be achieved without the use of the reference line, a ski-like arrangement may be substituted subject to the continued approval of the Chief Engineer. The use of the reference lines shall be reinstated immediately whenever the Contractor fails to maintain a superior pavement. The Contractor shall furnish and install all pins, brackets, tensioning devices, wire and accessories necessary for satisfactory operation of the automatic control equipment.

904.05 ASPHALT ROLLERS

Rollers shall be self-propelled, reversible and steel wheeled or pneumatic tired. Rollers may be vibratory or non-vibratory, and they may be operated in the vibratory mode as long as the Chief Engineer determines that the roller is not cracking or damaging the aggregate in the mix. Rollers shall not be used in the vibratory mode on bridge decks. Pneumatic tired rollers shall have multiple tires of equal size with smooth tread. Tires shall be uniformly inflated at the

operating pressure approved by the Chief Engineer. The Contractor shall furnish the Chief Engineer with charts or tabulations showing the contact areas and contact pressures for the full range of tire inflation pressures and for the full range of tire loadings for each type and size of compactor furnished. Rollers shall be operated according to the recommendation of the manufacturer.

904.06 HAND TOOLS FOR FINISHING ASPHALT SURFACES

- (A) **ASPHALT LUTE.** The asphalt lute shall be of aluminum or wood with a rigid blade 3 to 6 feet in length and 6 inches in width. The blade shall be edged on the contact surface. The handle, to one end of which the blade shall be firmly affixed with adequate bracing, shall be 16 feet in length.
- (B) **RAKES.** Rakes shall be made of metal and shall be not less than 14 inches wide. The tines shall be of sufficient depth to penetrate and rake the material for its full depth.
- (C) **SMOOTHING IRONS.** Smoothing irons shall be made of metal and shall weigh not less than 40 pounds. The bearing surface shall be not less than 80 square inches.
- (D) **HAND TAMPERS.** Hand tampers for compaction of bituminous material in locations inaccessible to rollers shall be of metal construction, weigh not less than 25 pounds and shall have tamping face of not less than 48 square inches.