

**ITEM 402 ASPHALT CONCRETE MIXING PLANTS****402.01 Description****402.02 General****402.03 Scales****402.04 Thermometers****402.05 Storage****402.06 Calibration****402.07 Computerized Plant System****402.08 Polymer Binders****402.09 Water Injection System for Warm Mix Asphalt**

**402.01 Description.** This specification consists of the minimum requirements for an asphalt concrete mixing plant to produce asphalt concrete mixes according to City specifications. Ensure asphalt concrete mixing plants conform to the requirements of City Supplement 1101 and ASTM D 995 in addition to the following.

**402.02 General.** If more than one kind of asphalt binder is to be used concurrently, separately store each kind.

Ensure that the adjustments for total and proportional feed are continuously variable and capable of being locked at any position.

Use batch plant hot bins that have an oversized material discharge pipe of not less than 6 inches (150 mm) in diameter. Ensure pipes discharge material at points outside the plant operation and do not create a hazard or discomfort.

In batch plants, use a non-tilting asphalt binder bucket with a loose sheet metal cover. Ensure that the length of the discharge opening or spray bar is not less than three-fourths the length of the mixer and that it discharges directly into the mixer. Ensure that the asphalt binder bucket, its discharge valve or valves, and spray bar are fully jacketed or heated. Use jackets that drain efficiently and ensure that all connections are constructed to not interfere with the efficient operation of the asphalt binder scales. Use an asphalt binder bucket with a capacity of at least 10 percent greater than the weight of asphalt binder required in any batch. Ensure that the plant has an adequately heated, quick-acting, nondrip, charging valve directly over the asphalt binder bucket.

**402.03 Scales.** Use scales and test weights that conform to the regulations of the Ohio Department of Agriculture. Seal scales as often as the Laboratory directs to ensure their continued accuracy. Seal test weights at least every 3 years at places designated by the Ohio Department of Agriculture. Equip the plant with one 50-pound (20 kg) test weight for each 400 pounds (200 kg) of the maximum batch weight with a minimum of ten test weights.

Provide a truck scale or recording batch plant scales for the purpose of obtaining the net weight of each load of asphalt mixture as required in 401.21.

Use truck scales that indicate the total weight within 20-pound (10 kg) increments and have a rated capacity of at least 10 percent greater than the largest load weighed. Provide a platform large enough to receive the largest truck used for a single weighing.

Use batch plant scales that have a capacity of at least 10 percent greater than the largest weight required for any one batch.

**402.04 Thermometers.** Equip the plant with an adequate thermometric instrument, clearly legible from the mixer operator's station, to monitor the temperature of the asphalt binder. Locate the sensing element or unit in the feed line near the charging valve at the mixer. Where a pyrometer is used, connect the indicator to the thermocouple by a weatherproof extension wire.

Also, equip the plant with either an approved dial-scale, mercury-actuated thermometer; an electric pyrometer; or other approved thermometric instrument so placed at the discharge chute of the dryer as to register automatically or indicate the temperature of the heated aggregates.

**402.05 Storage.** Provide storage bins capable of storing hot asphalt concrete mixtures up to 24 hours. Insulate or heat storage bins if mixtures are stored for more than 8 hours. Ensure that the system is capable of maintaining the required temperature without creating hot spots within the stored mixture. In addition, if hot asphalt mixtures are stored from 8 to 24 hours, then introduce a silicone admixture into the asphalt binder at the rate of 1 fluid ounce per 5000 gallons (1 mL/640 L).

**402.06 Calibration.** Calibrate the plant for each combination of aggregate, reclaimed asphalt concrete pavement, and asphalt binder type/content for the mixtures to be produced. Ensure that the calibration is accurate within 1.0 percent.

Submit a letter to the Laboratory verifying the plant has been calibrated in accordance with City Supplement 1101.

**402.07 Computerized Plant System.**

**A. General.** Produce all asphalt concrete in a plant with a computerized plant system approved by the Laboratory. Ensure that the computerized plant system's monitoring device for the asphalt binder content is capable of being locked or sealed. After initial calibration of the plant, the City may lock or seal the asphalt binder content monitoring device.

Ensure that all printouts contain the following information:

1. Date.
2. Time.
3. JMF number.
4. Percent asphalt binder in the reclaimed pavement to the nearest 0.1 percent.
5. Percent virgin asphalt binder to the nearest 0.1 percent.
6. Percent total asphalt binder calculated to the nearest 0.01 percent.

Ensure that all printouts are preapproved by the Laboratory and are turned over to the Engineer at the end of the Project or the end of the production year.

Ensure that the computerized plant system prints "SIMULATE" on the ticket or printout whenever the computerized plant system is only simulating asphalt concrete production.

Ensure that the computerized plant system has an audible alarm system that notifies the plant operator when the amount of asphalt binder, aggregate, or reclaimed pavement being mixed into the asphalt concrete is outside the tolerances established by

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the Contractor's Quality Control Manager. Make appropriate adjustments when production is outside the tolerances.

**B. Batch Plants.** In addition to the requirements of 402.07.A, print the information on each weight ticket if the asphalt concrete is directly loaded into the truck or on a separate printout for every 16 tons (15 metric tons) or less of production if the asphalt concrete is loaded into a storage silo. Ensure printouts contain the following additional information:

1. Tare weight of the asphalt binder scale.
2. Tare weight of the aggregate scale.
3. Pounds (kilograms) of virgin asphalt binder.
4. Pounds (kilograms) of virgin aggregate.
5. Pounds (kilograms) of reclaimed pavement measured by a batch scale.
6. Tons per hour (metric tons per hour) of reclaimed pavement measured by a belt scale.

**C. Drum Mix Plants.** In addition to the requirements of 402.07.A, print the information every 5 minutes during production. Ensure printouts contain the following additional information:

1. Tons per hour (metric tons per hour) of virgin asphalt binder.
2. Tons per hour (metric tons per hour) of virgin aggregate.
3. Tons per hour (metric tons per hour) of reclaimed pavement.
4. Moisture content of the virgin aggregate.
5. Moisture content of the reclaimed pavement.

**402.08 Polymer Binders.** If an asphalt binder is modified by SBR polymer at an asphalt concrete mixing plant, equip the plant with an SBR polymer flow meter and monitoring system. Obtain the Laboratory's approval of the system before operating. Demonstrate the system calibration to the City. If the City waives the demonstration, provide a letter documenting calibration data for the flow system to the Engineer for each project. Obtain written approval from the Laboratory for the use of SBR and ensure the QCP contains methods for properly controlling SBR.

For drum mix plants, introduce the SBR polymer directly into the asphalt binder line through means of an in-line motionless blender or other device approved by the Laboratory which is able to provide a homogeneous blend.. Locate a sampling valve between the in-line blender and the plant drum.

For batch plants, add the SBR polymer after the aggregate has been completely coated with asphalt binder. Continue mixing for a minimum of 20 seconds after SBR polymer is added and long enough to provide a uniform mixture.

Ensure the SBR pumping and metering system is capable of adding the SBR within the limits of 702.01. For drum plants ensure the SBR pump is automatically controlled by an independent computer and interfaced with the asphalt binder flow to automatically

maintain the SBR flow within specification limits. Produce asphalt mixtures for placement in automatic SBR control mode only.

Ensure the SBR meter is accurate to +/- 2.0 percent over a flow range typical of that used at the asphalt plant (typically 8 to 12 gpm (30 to 45 L/min) at drum plants and 10 to 25 gpm (38 to 95 L/min) at batch plants). Ensure the SBR meter is a magnetic flow meter consisting of a metering flow tube which utilizes Faraday's Law of Induction to measure the flow and includes a transmitter to transmit the flow signal to a totalizer located in the control room of the asphalt plant. Locate the SBR meter downstream of any recirculation lines. Provide a means for removing the SBR line at the in-line blender to be able to obtain a sample of the SBR for calibration purposes.

Obtain Laboratory approval for use of any other type of SBR meter. Ensure the totalizer displays total volume measured and flow rate in standard engineering units. Ensure the totalizer is interfaced with a data logger which produces printouts of the logged data every five minutes for a drum plant or every batch for a batch plant. Ensure the logged data includes time, date, flow rate, and flow total except flow rate is not necessary for batch plant production.

Balling or wadding of SBR or uncoated aggregate indicates improper mixing; cease production immediately and until corrected to Laboratory satisfaction.

**402.09 Water Injection System for Warm Mix Asphalt.** When allowed by specification use a City approved water injection system for the purpose of foaming the asphalt binder and lowering the mixture temperature. Ensure equipment for water injection meets the following requirements:

1. Injection equipment computer controls are in the plant control room and are tied to the plant computer metering.
2. Injection equipment has variable water injection control controlled by the plant operation rate and the water injection can never exceed 1.8% by weight of asphalt binder.
3. Water injection rate cannot be manually overridden by the plant operator once in the computer.
4. Injection equipment stops water flow when a control or equipment failure in the injection system occurs.
5. The water injects into the asphalt binder flow before the asphalt binder spray hits aggregate. Do not allow water to touch aggregate before the binder spray.
6. Injection equipment includes water storage and pump control tied to the injection computer controls.
7. Water storage low water alarm installed in the control room.
8. Provide a PG binder sampling valve between the last piping tee on the tank side of the line and the injection equipment to sample PG binder before water is injected.
9. Provide a PG Binder sampling valve at the injection equipment to sample binder prior to spray.