



4-51.1 General

There are two basic types of hot asphalt mixing plants, the drum mixer and the batch plant. Drum mixing is a continuous mixing process, whereas batch mixing is an intermittent process of preparing individual batches of hot mix. Each type may be of a stationary, commercial setup, or may be assembled for use on a specific project and moved upon completion of the project.

Regardless of type, all asphalt mixing plants have certain basic functions and components that perform those functions:

- Storage in aggregate stockpiles, the asphalt storage tank, and the burner fuel storage tank.
- Proportioning and feeding by the aggregate cold bins and cold feeds, and by the asphalt pump, meter, and pipeline.
- Heating and drying using the aggregate dryer or the drum mixer.
- Mixing in the mixing chamber of the batch plant or in the drum mixer.
- Storage of hot mix in the storage silo or surge bin.
- Controls contained in the control house.
- Dust collection by the primary (mechanical) collector and by the secondary (baghouse or wet scrubber) collector.

The contractor is responsible for setting up and maintaining the plant, for operations of the plant, and for providing the quality control necessary to produce an asphalt mix meeting the specifications. The contractor is responsible for recognition of defects and their timely correction.

The quality assurance team is responsible for ensuring that quality control by the contractor is adequate. This is accomplished by:

- Conducting assurance testing.
- Observing the sampling and testing performed by the contractor.
- Monitoring the required control charts prepared by the contractor.
- Directing the contractor to take additional samples for quality assurance testing.

The quality assurance team will not issue instructions to the contractor relative to the setting of dials, gauges, meters, or other adjustments to the plant.

4-51.2 Stockpiling Aggregates

Aggregates are delivered to the plant site before and during production by truck or rail car. They must be stockpiled in a manner that minimizes segregation and avoids contamination. The stockpile areas must be level, free from water and ice, and large enough to prevent mingling of piles. The foundation must be firm and free of rocks, vegetation, and debris. Stockpiles should be built in layers no more than 5 inches in thickness. If a central conveyor is used to build the piles, it should be traversed frequently to avoid coning, which segregates the particles. If a crane with a clam bucket is used, the aggregate should be dumped rather than cast. Loads hauled upon the pile by truck should be dumped rather than spread. Leveling of the layers should be done by rubber-tire equipment to minimize segregation and degradation. Each layer should be completed before the next layer is begun.

If bulkheads or partitions are used to separate stockpiles, they should be sufficiently strong to withstand overturning forces and should be free of holes and cracks.

The source for the aggregate should have been tested for quality before stockpiling begins.

4-51.3 Asphalt Storage

Asphalt storage consists of a tank or tanks for storing and heating the asphalt until it is needed. Heating is done by circulating hot oil through an internal piping system, or by the use of internal, electrically-heated coils.

The QA team should check that the tank and lines don't leak and that the asphalt is being heated to the specified temperature and is being maintained at that temperature. The tank volume should be calibrated so a depth measurement can be readily converted to a volume.

When QMP is a contract item it is not necessary for the QA team to observe the "sticking" or measuring of the depth of asphalt in asphalt storage tank(s) during the progress of the work.

When QMP is not a contract item, standard specifications require the QA team to determine the total mass of asphaltic material incorporated in the mixture during a selected period of time. Contractor personnel should do the actual "sticking" or measurement observed by a member of the QA team.

It also is necessary to observe the measurement, by contractor personnel; of the quantity of asphalt remaining in the storage tank(s) at the end of mix production for work under the contract.

4-51.4 Hot Asphaltic Mixture Storage System

The hot asphaltic mixture may be conveyed to a storage silo or a surge bin in an enclosed bucket elevator designed to reduce heat loss and segregation to a minimum.

Silos are heated and/or insulated to allow storage of the mix without major heat loss. For best results, they should have a hopper at the top that collects mix from several incoming buckets and drops the collection en masse into the silo, thus reducing chance of segregation. The stored mix is dropped, upon demand, through surge gates (located at the bottom of the silo) directly into a truck, or it may be dropped into a batcher where it is weighed and then dropped into a truck. If there is no batcher, a truck scale is needed to obtain the loaded truck weight. [Standard spec 450.3.2.2](#) allows mix to be stored in silos.

Surge bins are uninsulated, unheated metal bins suitable for holding hot mix up to two hours. Longer storage will result in major heat loss. Usually the bin empties, upon demand, directly into a truck so that a truck scale must be provided.

4-51.5 Automation and Interlock

[Standard spec 450.3.1.1.2](#) requires that all batch plants used on projects involving 10,000 tons or more of asphaltic mixtures have automatic controls which control the entire mixing and discharge of a batch by a single switch or button. This subsection specifies in detail the interlock requirements for automatic operation and specifies the tolerances that are applicable to the incorporation of the various components in the mix.

Manual or automatic batch plants can be used on projects under 10,000 tons of mixture. When a contractor elects to operate a batch plant in the automatic mode when not required, the plant operation must still meet all the requirements for automatic operation, except that recordation is not required. A contractor may, however, elect to operate an automatic plant in the manual mode when the specifications do not require automatic operation.

The inspector should not plan on observing any checking or testing of the automation or interlock controls unless there is a problem with the mix.

There are no similar specification requirements for continuous mixing or drum mixing plants.

4-51.6 Recordation

Automatic digital recordation is required on all contracts involving 10,000 tons or more of asphaltic mixture. On such contracts either automatic batch recordation as per [standard spec 450.3.1.1.3](#) must be used, or a digital recorder shall be installed as part of the platform truck or storage hopper scales conforming to [standard spec 450.3.1.1.4](#).

In the event of a breakdown of the automatic recorder on such contracts, the plant may be used with manual recordation for not more than two days.

Manual recordation may be used on contracts involving less than 10,000 tons of asphaltic mixture. The QA team should confirm that the recordation has been checked before production for the contract.

The truck scale can be checked by weighing a loaded truck and comparing to the weight of the same load on a certified commercial scale. The batch scales can be checked by comparing batch weights to a loaded, tared truck weight from a contractor's certified aggregate scale. This method is only a check on the recordation and does not replace accuracy requirements for plant scales, truck scales, or storage hopper scales.

4-51.7 Plant Safety

By its very nature, the plant can present hazards not normally encountered on the job. Danger of burns, the possibility of fire and explosion, and the presence of moving conveyor belts and other machinery in motion are some of these hazards. Unsafe conditions should be brought to the attention of the contractor for prompt correction.

Although there can be a multitude of unsafe conditions, the following list includes some of the most serious. Several are specifically regulated by OSHA.

- Unsafe stairs, platforms, and ladders. Permanent walkways should be provided to all areas of the plant. They should have railings.
- Smoking in prohibited areas. There should be no smoking, no open flames, and no welding operations around

fuel storage tanks and asphalt storage tanks (OSHA 1926.151, 1926.352).

- Unsafe traffic patterns and parking patterns. Safe entrance and exit points at the highway should be established. A non-crossing traffic pattern should be established within the site. Vehicles should be parked in a defined area away from highway and plant traffic.
- Dust clouds that obscure the vision of truckers and plant workers. Dust should be controlled by the plant's dust collection system. Travel ways should be periodically wetted down (OSHA 1926.57).
- Exposed belts, pulleys, and drive mechanisms. These should be shrouded to prevent worker injury (OSHA 1910.219).
- Leaks in asphalt lines and heating oil lines. These should be regularly inspected for leaks to avoid possibility of fire and explosion (OSHA 1910.106).
- Hard hats not used. Hard hats should be worn by all workers and visitors at the site to protect against falling objects (OSHA 1926.100).
- Slumping stockpiles. Workers should not stand on stockpiles or bins while the plant is operating to avoid falling and being buried.

Refer also to [CMM 1-35](#) for further guidance regarding safety rules and regulations for general construction.

4-51.8 Records and Reports

The necessary records and reports will be prescribed by the engineer and normally include:

- QA team's diary
- Paving Inspector's diary
- Log of mix produced, wasted, sold to other, or rejected
- Log of asphaltic material received and used
- Log of additives used
- Record of samples, tests, and results
- Load tickets and truck tare record
- Mix design changes
- Scale and thermometer testing

Records should be kept current. Reports should be submitted at the required frequency. At the end of the project all diaries and logs should be transferred to the engineer.