



Removed optional Contractor Assurance language.

4-53.1 Mix Design

The contractor shall submit samples, representative of the aggregate proposed to be used in the work, for aggregate quality testing purposes and mixture design review. The sampling of aggregates shall be done under the observation of the engineer. The samples shall arrive in the central materials laboratory at least 14 days before proposed use in the work.

The contractor shall develop and submit to the central materials laboratory an asphaltic mixture design for each layer of HMA pavement per [CMM 8-66.2](#). The central materials laboratory will review the quality of the aggregate and asphaltic mixture design, and will issue a report with copies to the contractor and the region office. A copy is also entered on the Materials Tracking System (MTS). The asphaltic mixture design will be in effect until modified in writing.

The region section responsible for materials quality should furnish the QA team with the following:

- The test number of the quality test report for the aggregate sources being used.
- A copy of the contractor's mix design and the verifications report from the central materials laboratory.

After production has begun, it may become necessary to adjust the job mix formula. The department's current policy follows:

The contractor will notify the engineer of the proposed change in written form using the standard "REQUEST FOR JMF CHANGE" sheet. Comments must include the sample test number that indicates when the change is to become effective. The change, if approved, may become effective at a test point up to four individual tests before the test when the request was formally made. Documentation that the QC/QV team had discussed a possible JMF Change must exist for the change to occur at a point before the test number on the formal request.

Further changes, subsequent to the original property change, will not be granted until six additional individual test points (within the normal sampling frequency) for the affected mix (test) property have been generated. Each JMF sieve will be considered as an individual mix (test) property. Control chart(s) for the affected property(ies) will accompany the "REQUEST FOR JMF CHANGE."

4-53.2 Start Up

A **department representative** should be present at the QC laboratory on start up day. Procedures to follow are outlined in the quality assurance portion of [CMM 8-36](#).

It should be noted that the specifications do not allow latitude in meeting the requirements due to start-up or initial mix productions.

4-53.3 Temperature of the Mix

A temperature range will be specified on the mix design. This will vary depending on the grade and source of the asphalt. Mixtures produced in a drum mixer shall be within 15 F (8 C), plus or minus, of the mixing temperature specified by the mix design.

The mixture shall be delivered to the receiving hopper of the paver at a temperature within 20 F (11 C) of the compaction temperature recommended by the asphaltic material supplier. All loads shall be covered during inclement weather, or when the ambient air temperature falls below 65 F (18 C).

Overheating can be as undesirable as under-heating. At no time should the temperature exceed the limits provided. If loads obviously appear too hot, as evidenced by smoking or rocks cracking, the temperature should be checked.

4-53.4 Change in Asphalt Source

The contractor may elect to obtain asphalt from the source or sources of the contractor choice as long as they have been certified, or the asphalt tested, for conformity with the requirements of the specifications. Other sources may also be used, with the permission of the engineer, before testing, when they are known to have a satisfactory record of furnishing materials conforming to the specification requirements.

4-53.5 Sampling and Testing

The contractor's **QC** program should contain an outline of sampling and testing activities. The QC and **QV** teams

should come to consensus on aggregate sampling locations.

[Standard spec 460](#) sets forth the required frequency of testing based on the total daily plant production. The contractor may conduct additional tests as required by specification if needed for control of quality during production. At the beginning of each day, the contractor shall specify the quantity anticipated to be produced. The frequency of sampling is then determined based on the anticipated daily production.

All sampling is the responsibility of the contractor. Random sampling for QC to ensure compliance with the specifications or to make adjustments to the plant during production shall be determined by the QC team. Additional samples for **quality assurance** shall be taken as directed by the team. This additional sampling and testing may be to observe the QC team's technique or to evaluate questionable materials.

[Standard spec 460](#) sets forth specifications for quality tests. The **standard spec states** that the data from testing will be provided to the contractor within two asphaltic mixture production days after the sample has been received by central materials laboratory. **The QV team must witness the sample being taken by the QC team and then take immediate possession of the sample.**

Aggregate samples submitted for aggregate quality testing purposes shall be obtained under the observation of the engineer.

Asphalt binders are accepted for use on WisDOT projects by certification. The department's policy for "Certification Method of Acceptance for Asphalt Binders" provides for obtaining "Verification Field Samples" of asphalt binders. These samples shall be obtained by contractor personnel. A QV QA team member should observe the contractors sampling until assured the correct procedures are being followed.

Performance grading is designated by two numbers representing the high and low temperature extremes at which the asphalt binder is expected to perform. WisDOT currently is specifying a Multiple Stress Creep & Recovery (MSCR) performance graded asphalt binder of at least 58-34 S in the surface of new construction, reconstruction, or pavement replacement in the Northern Asphalt Zone. (see Figure 2), and at least 58-28 S in all other locations. This refers to asphalt binders that will perform satisfactorily statewide where the maximum 7 day average high pavement temperature does not exceed 135 F (58 C), and the minimum pavement temperature is -30 F (-34 C) or warmer in the Northern Asphalt Zone and -18 F (-28 C) or warmer in all other locations.

4-53.6 Acceptance

The acceptance of HMA Pavement mixtures will be based on the results of the contractor's random testing, defined in [standard spec 460](#), and verified by the engineer.

If the engineer waives contractor testing or QMP is not a contract item, the acceptance of HMA pavement mixtures will be in accordance with [standard spec 465](#).

Specification conformance for asphaltic base course mixtures will be based on [standard spec 465](#) **unless further detailed in governing base course acceptance requirements on the contract.**

The acceptance of virgin asphaltic materials furnished will be based on the department's Certification Method of Acceptance for Asphalt Binders.

The acceptance of asphaltic materials recovered from salvaged or reclaimed asphaltic pavements will be based on the acceptance of the asphaltic mixture produced from such material.

4-53.7 Measurement

Unless otherwise provided in the contract provisions, asphaltic mixture will be measured by the ton of mixed aggregate and asphalt delivered to and incorporated in the work. All asphaltic mixture allowed to remain in place will be measured for payment.

[Standard spec 460](#) provides that mixtures shall be weighed on approved truck or storage hopper scales equipped, when necessary, with a digital recorder or printer, or on plant scales equipped with a digital recorder or printer. [Standard spec 460](#) defines "when necessary" as on contracts involving 10,000 tons or more of asphaltic mixture. Weigh tickets showing the net weight of each load of material shall be supplied to the project engineer.

The weight of minor quantities of mixture may be based on batch weights, when approved by the engineer.

4-53.8 Corrective Action

Corrective action as set forth in [standard spec 460](#) details when the contractor should stop production and make adjustments to the production process based on tests for gradation, asphalt content, air voids, and VMA. Also detailed in this subsection are reduced payment, removal, and replacement of unacceptable material based on

the above mentioned testing data.

[Standard spec 460](#) defines the control limits and warning bands, which are the basis for corrective action and the **acceptable verification parameters**.

4-53.9 Reduced Payment

The standard specifications provide for reduced payment for various items that do not meet specifications but are considered to be reasonably acceptable and can be accepted and remain in place. To facilitate paying for such items a schedule of 800.XXXX items has been created for use with the construction estimate. This schedule is included in [CMM 2-38](#). The appropriate 800.XXXX item numbers have been included in the following discussion of reduced payment for asphaltic mixes and asphaltic materials.

In the event **random QV tests result in material outside the specification limits**, the **central materials laboratory at BTS** test data will be used to determine the appropriate payment factor or acceptability of the mixture as specified in Section 460. **This process of BTS test result inclusion is detailed in CMM 8-36.**

4-53.10 Temperature/Volume/Mass Conversions

Asphaltic materials required for and incorporated in the work will be measured (for estimation, not payment) by volume in gal or by tons. The volume of asphaltic materials in storage tanks must be measured and converted to volume at 60 F, or to weight, for accurate estimation purposes. This conversion is **calculated in accordance with standard spec 455**. The density for the asphaltic material may be obtained from the test report data.

4-53.11 Mixture Appearance

4-53.11.1 Uniformity

The mixture should be uniform in appearance and uniform in texture.

Nonuniformity in appearance may be caused by:

- Improper mixing or insufficient mixing
- Improper proportioning of aggregate, asphalt, or salvaged material
- Improper blending of aggregate
- Incomplete breakdown of salvaged material
- Slugging (masses of unmixed ingredients) in the aggregate bins or feed
- Bad screens or bad screening procedure

Nonuniformity in texture may be due to the following:

- Segregation of aggregate in stockpiles, bins or feeds
- Improper mixing of aggregates
- Insufficient heating, dispersion, or mixing of the salvaged asphaltic pavement with the virgin aggregate and virgin asphaltic material
- Segregation in the mixer or mixer discharge
- Nonuniform blending of aggregates
- Slugging in the aggregate bins or feeds
- Bad screens or bad screening procedure

Uncoated particles may indicate excessive moisture, or coating such as clay or silt on the aggregate that interferes with the bond between aggregate and asphalt, or aggregate to which the asphalt will not adhere satisfactorily. Increased drying time, increased washing, or the use of anti-stripping chemical agents, may cure these problems.

4-53.11.2 Color and Texture

A satisfactory mix is colored dark-brown to black, all particles are well coated, the mix has a wormy, alive appearance when agitated and the general texture of the finer portions shows a sugary appearance. A mix that appears a lighter brown in color or dead, does not have a wormy appearance when disturbed, or segregates unduly on discharge, indicates a low asphalt content or wet aggregate. Items to check include mixture proportions, aggregate gradation for excessive fines, tare of asphalt bucket, or the calibration and operation of the asphalt pump. Also, the dryer or mixture temperature, cold feed settings, and moisture content of aggregate or mixture are possible causes.

A mix too rich in asphalt shows excessive asphalt in coating. Fines have a tendency to ball up instead of appearing sugary, and on discharge the mix tends to flatten out instead of building a mound. Items to check

include mixture proportioning, aggregate gradation for lack of fines, tare of asphalt bucket, or the calibration and operation of the asphalt pump.

Temperature of the mix should be within the range allowed by the specifications or as ordered by the manager. There should be no odor of burned asphalt. If there is, the contractor should reduce plant temperature of the asphalt heater or the mixer.

4-53.11.3 Segregation

Segregation can easily occur. It can be caused by accumulations in the mixer, by improper use of storage hoppers, by dropping the mixture into a truck from too great a height, and by filling the truck completely from only one position. Segregation must be controlled to the greatest feasible degree at the plant, since it cannot be entirely corrected subsequently.

4-53.12 Asphalt Mix Problems and Causes

[Figure 1](#) provides a matrix, detailing common asphalt mix problems and the possible causes.

Figure 2 Asphalt Zone Map

