MODIFIED BY EB 97-025 EFFECTIVE 4/11/97 **SUPERSEDED** BY EI 98-031 EFFECTIVE 1/14/99		*New York State Department of Transportation* ENGINEERING INSTRUCTION	**EI** 97-010

Title: REVISIONS TO SECTION 402, QUALITY CONTROL ASPHALT CONCRETE - GENERAL AND THE NEW PHASE-IN QUANTITY ADJUSTMENT FACTORS

Distribution:		Approved:
☐ Manufacturers (18)	☐ Surveyors (33)	
☒ Main Office (30)	☒ Consultants (34)	
☐ Local Govt. (31)	☒ Contractors (39)	
☒ Regions/Agencies (32)	☐ _____ ( )	R. T. Wells, Deputy Chief Engineer Construction Division — For — Date: 4-4-97

This Engineering Instruction supersedes EI 96-049 and EI 96-025.

The Department has revised Section 402, Quality Control Asphalt Concrete - General, based on experience gained during the 1996 construction season and continuing discussions with Industry. A new Quantity Adjustment Factor (QAF) Conversion Table is included with phase-in rates for 1997 through the year 2000 to allow a more gradual implementation of incentives and disincentives.

This instruction transmits the revised Section 402, Quality Control Asphalt Concrete-General specifications, dated April 1, 1997 (English and Metric).

Section 402 has been modified as follows:

Quantity Adjustment Factor Conversion Table: The phase-in rates for 1997 through the year 2000 have been revised. Producers will be allowed to obtain an incentive each year of the phase-in period. In 1997 and 1998, QAFs between 0.90 and 1.00 will be paid at a QAF of 1.00. Disincentives will be phased in for 1999 at 50% and for 2000 at 100%. In each year, QAFs less than 0.90 will be evaluated in accordance with procedures outlined in section 402-4, Method of Measurement.

QAF Tables 402-3 thru 6: Tables 402-3 thru 6 (Volumetric and Non-Volumetric) have been changed to a one column format and are now identified as **Tables 402-3 and 402-4**. Also **Table 402-3 (air voids)** has been adjusted to allow a 2.00% maximum range at the 0.90 QAF.

Quantity Adjustment Factors: All QAFs from 0.90 to 1.05 will be in increments of 0.01.

Sublots: Sublot sizes have been increased from **750 tons to 1250 tons** and no testing is required on the first or last **150 ton** portion of a sublot.

Certification Without Testing: The allowable quantity for certification without testing has been increased from **75 tons to 150 tons** and the Quality Control Technician (QCT) does not have to be present, providing the Regional Materials Engineer is notified and approval is given.

Production Option at a QAF of 1.00: The option size has been increased from **200 tons to 500 tons.**

Production During First Day of the Season: A QAF of 1.00 has been incorporated for production of any prior Production Status mix designs **(as outlined in the SUPERPAVE MM-5.16 design verification procedures)** during the first day of each construction season. Also, any production yielding final QAF greater than 1.00 will be adjusted based on that QAF.

0.85 Interpretation: Section 402-4, Method of Measurement has been revised to reflect a clearer definition of unacceptable material. Also, all production yielding a daily final QAF less than 0.90 will be evaluated as outlined in Section 402.

The implementation of the revised Section 402 will be accomplished as follows:

- The Design Quality Assurance Bureau will insert the attached Quantity Adjustment Factor Conversion Table and the revised Section 402 into all Department contracts that have hot mix asphalt production let on or after July 24, 1997.

- For all Department contracts let prior to July 24, 1997, but on or after May 23, 1996, that contain specification Section 402, replace the existing Quantity Adjustment Factor Conversion table and Section 402 with the attached revised Quantity Adjustment Factor Conversion Table and the revised Specification Section 402. This substitution is to be made at no change in the unit bid prices. No order-on-contract is required. A copy of this instruction shall be made part of the project records on any project where the substitution is implemented, in accordance with the Department's Contract Administrative Manual (CAM) Section 104 -03 I.4.

- On Department contracts that have hot mix asphalt production, let before May 23, 1996, that do not include Specification Section 402, the Contractor may elect to add the revised Quantity Adjustment Factor Conversion Table and Specification Section 402. This change will be made by an Order-on-Contract at no change in the unit bid price.

Questions regarding this Engineering Instruction should be directed to Gary Frederick or Dave Whiteley of the Materials Bureau at (518) 457-4582 or Jodi Riano of the Construction Division at (518) 457-4412.

QUALITY CONTROL ASPHALT CONCRETE PRODUCTION

ATTENTION

The Contractor is advised that this Contract Proposal contains a specification, **Section 402 Quality Control Asphalt Concrete - General,** which is a Quality Control performance-related specification by which the contractor, through the hot mix asphalt manufacturer, is responsible for all Quality Control activities relating to the production of hot mix asphalt. The hot mix asphalt manufacturer is required to perform and document all Quality Control sampling and testing activities in accordance with procedures outlined by the Department. These procedures are available through the Regional Materials Section or the Central Office Materials Bureau.

The contractor shall also be aware this specification contains Quantity Adjustment Factors for all hot mix asphalt pay items. The **Quantity Adjustment Factor Conversion Table** below incorporates phase-in factors that will be applied during each noted Calendar year when calculating the daily payment quantities of hot mix asphalt production supplied to Department projects.

The Quantity Adjustment Factors specified in **Section 402, Tables 402-3 and 402-4,** shall be changed accordingly. However, all Quantity Adjustment Factors listed in **Section 402** that are used for process control and acceptance shall not be changed and shall be referenced to the original specified factors.

Quantity Adjustment Factor Conversion Table

Phase-In Quantity Adjustment Factors				
Specified in Tables 402-3 and 402-4	Calendar Year Production			
	1997	1998	1999	2000
1.05	1.05	1.05	1.05	1.05
1.04	1.04	1.04	1.04	1.04
1.03	1.03	1.03	1.03	1.03
1.02	1.02	1.02	1.02	1.02
1.01	1.01	1.01	1.01	1.01
1.00	1.00	1.00	1.00	1.00
0.99	1.00	1.00	0.995	0.99
0.98	1.00	1.00	0.990	0.98
0.97	1.00	1.00	0.985	0.97
0.96	1.00	1.00	0.980	0.96
0.95	1.00	1.00	0.975	0.95
0.94	1.00	1.00	0.970	0.94
0.93	1.00	1.00	0.965	0.93
0.92	1.00	1.00	0.960	0.92
0.91	1.00	1.00	0.955	0.91
0.90	1.00	1.00	0.950	0.90
0.85 (1)	0.85 (1)	0.85 (1)	0.85 (1)	0.85 (1)

(1) Refer to §402-4, Method of Measurement.

QUALITY CONTROL ASPHALT CONCRETE PRODUCTION

Make the following changes to the Standard Specification of January 2, 1990:

Page 4-20, *Replace* "SECTION 402 - VACANT" with the following:

"SECTION 402 - QUALITY CONTROL ASPHALT CONCRETE - GENERAL

402-1 DESCRIPTION. This performance related specification applies to the manufacture of all hot mix asphalt utilizing a Quality Control/Quality Assurance system for governing production. Quality Control is defined as all activities required to produce hot mix asphalt that meets all specification requirements. The Contractor, through the hot mix asphalt Manufacturer, is ultimately responsible for all Quality Control activities relating to the production of hot mix asphalt.

The Manufacturer shall produce hot mix asphalt according to specification requirements and provide daily documentation on the quality of the hot mix asphalt. The hot mix asphalt payment quantity will be adjusted daily based on the quality of the hot mix asphalt produced. The Manufacturer shall certify daily that production meets the specification requirements.

The Department is responsible for Quality Assurance. Quality Assurance is defined as all activities performed by Department personnel to assure that the production of hot mix asphalt meets the specification requirements. The Department will determine the hot mix asphalt daily adjusted quantity using a Quantity Adjustment Factor. Quantity Adjustment Factors are determined from the materials variation from the mean of the specification limits using tables contained in this specification.

402-2 MATERIALS. The details of §401-2, Materials, shall apply unless otherwise specified in the contract plans or proposal and as modified herein. All hot mix asphalt supplied to Department projects shall be produced in accordance with the requirements outlined in this specification, and all applicable Test Methods and Materials Procedures. Hot mix asphalt mixture designs shall be formulated as required and must be acceptable to the Department prior to any project production.

Any mix design assigned production status is allowed to be supplied to Department projects on the first production day of the construction season at a final Quantity Adjustment Factor of 1.00, providing the required test results yield a final Quantity Adjustment Factor of 0.90 or greater. When the required test results yield a final Quantity Adjustment Factor greater than 1.00, the highest calculated Quantity Adjustment Factor will be used. When the required test results yield a final Quantity Adjustment Factor less than 0.90, the subject production will be evaluated in accordance with procedures outlined in §402-4, Method of Measurement.

The Department reserves the right to reject any production material that demonstrates unacceptable quality or exhibits properties that will affect the anticipated performance in accordance with Section 105, Control of Work and Section 106, Control of Material.

402-3 CONSTRUCTION DETAILS. The details of §401-3, Construction Details, shall apply except as modified below:

402-3.01 Quality Control. The Contractor shall make arrangements with the Manufacturer to provide a production control system to produce hot mix asphalt for Department projects that conforms to all specification requirements.

The Manufacturer shall sample and test hot mix asphalt prior to acceptance on Department projects. The sampling and testing shall be performed in accordance with procedures approved by the Department. The Manufacturer shall maintain complete records of all Quality Control test results and actions taken. The records shall indicate the nature and type of deficiencies and corrective actions taken. All Quality Control test results shall be documented in a legible manner and provided to the Department. Hot mix asphalt produced without the required sampling, testing and documentation may be rejected.

QUALITY CONTROL ASPHALT CONCRETE PRODUCTION

A. Control Plan. The Manufacturer shall provide the Regional Materials Engineer with a control plan. The control plan shall outline all phases of the production process and actions necessary to ensure specification conformance. The control plan shall display in organizational form, a list of all personnel associated with the production of the hot mix asphalt. This list shall identify all personnel names and their functions necessary to implement all elements of the Quality Control program. The plan administrator, designated assistant, quality control personnel and phone numbers shall be included. The administration of the control plan shall be the sole responsibility of the Manufacturer. As a minimum, the control plan shall contain the following:

1. Quality control organizational list.
2. Identification of the plan administrator, designated assistant and quality control personnel.
3. Qualifications and responsibilities of individuals.
4. Lines of communication to the Department.
5. Private testing organization representing the Manufacturer, including services provided.
6. Sampling and testing that ensures process control.
7. A list of all sampling and testing equipment used for process control.
8. Actions and corrective actions that ensures specification conformance.

The control plan shall be submitted annually to the Regional Materials Engineer for approval a minimum of fifteen working days prior to any hot mix asphalt production. Hot mix asphalt production without an approved control plan will not be allowed. Updates or changes to the control plan, or personnel, must receive prior approval by the Regional Materials Engineer. Control plan guidelines are available from the Regional Materials Engineer.

The control plan may be operated by the Manufacturer or a private testing organization representing the Manufacturer. If a private testing organization is used to implement all or part of the control plan, the personnel assigned to the production facility site shall be identified on the organizational list.

A separate control plan shall be submitted for each production facility site. When more than one plant is located at a production facility site, only one control plan is required. All plants located at the production facility site must be outlined in the control plan. All sampling and testing equipment used to implement the control plan shall meet the requirements pertaining to the testing procedure. The Department reserves the right to stop production for Department projects in the event the control plan is not followed.

B. Quality Control Organization. The quality control organization shall consist of the following:

1. Plan Administrator. The plan administrator shall be a representative of the Manufacturer and have full authority to institute all actions necessary for the operation of the control plan. The plan administrator is responsible to ensure all requirements of the specification are in conformance. The plan administrator's signature shall be legally binding for the Manufacturer. One plan administrator is allowed to be responsible for multiple production locations. An assistant plan administrator may be designated in the absence of the plan administrator. The plan administrator or assistant must be available to communicate with the Department's representative at all times. The Department reserves the right to stop production for Department projects when the plan administrator or designee is not available.

2. Quality Control Technician. The Manufacturer shall provide a sufficient number of hot mix asphalt Quality Control Technicians to perform quality control sampling and testing. The Quality Control Technician must possess a current New York State Asphalt Pavement Association Certification for Hot Mix Asphalt Sampling and Testing or its equivalent, as determined by the Director, Materials Bureau. A minimum of one certified Quality Control Technician shall be present at each production facility site. Production facility sites having multiple plants may utilize non-certified Technicians to augment the certified Technician. Hot mix asphalt production is not acceptable unless the certified Quality Control Technician is present during production. However, the certified Quality Control Technician is not required to be present for production of 150 tons or less, if approved by the Regional Materials Engineer. Technicians associated with private testing organizations shall meet the requirements for a Quality Control Technician.

The Department reserves the right to stop plant production for Department projects in the event unacceptable Technician performance is noted. The Regional Materials Engineer or representative will immediately inform the plan administrator regarding the reasons for stopping plant operations.

The Department may require the Manufacturer to replace unacceptable technicians before plant production is allowed to continue. As a minimum, the certified Quality Control Technician shall be responsible for the following:

a. Have knowledge about all plant equipment used for hot mix asphalt production.
b. Perform all quality control sampling and testing as required.
c. Document all quality control test results and actions necessary to ensure process control.
d. Maintain a separate quality control book for each plant.
e. Document all quality control test results in a legible manner.
f. Keep quality control test results and plant diary updated on a daily basis.

402-3.02 Production Facility Laboratory. The Manufacturer shall maintain an approved production facility site laboratory equipped with necessary equipment to perform all required hot mix asphalt sampling and testing. Testing equipment requiring calibration shall be calibrated annually and certified by the Manufacturer that all testing equipment meets the required operational tolerances. Verification of the production facility site laboratory and testing equipment will be performed annually by the Department and whenever deemed necessary. Laboratory sampling and testing equipment shall be made available to the Department's Quality Assurance personnel. The requirements under §401-3.02 A.-ll, Inspection Facilities shall apply. In addition, the following equipment is required.

A. Maximum Specific Gravity Equipment. Equipment necessary to determine the maximum specific gravity of bituminous paving mixtures. All sampling and testing equipment shall meet the requirements outlined in AASHTO T209, Standard Test Method for Maximum Specific Gravity of Bituminous Paving Mixtures.

B. Bulk Specific Gravity Equipment. Equipment necessary to determine the bulk specific gravity of bituminous paving mixtures. All sampling and testing equipment shall meet the requirements outlined in AASHTO T166, Bulk Specific Gravity and Density of Compacted Bituminous Mixtures using Standard Surface Dry Specimens.

402-3.03 Plant Lots and Sublots. Plant lots and sublots shall be determined on a daily basis using NYSDOT Materials Procedure 94-04, Testing Frequencies Using Random Sampling at a Hot Mix Asphalt Plant.

A plant lot is defined as the quantity in tons of hot mix asphalt produced per plant for each mix design in one day. When different mix designs are produced on the same day, then each mix design represents a separate plant lot. Plant lots shall be consecutively numbered throughout the production season and start at the beginning of each calendar year's production. Plant lot numbers (i.e., 1-200) will be assigned for each mix design produced and increased by one for each production day. Sublots will be assigned a consecutive letter (A-F) and shall begin with "A" each production day. When hot mix asphalt is manufactured and stored on a day prior to delivery, the quantity and plant lot number will be associated with the date of delivery.

Plant lots are subdivided into sublots and are based on the anticipated daily production. A sublot is defined as a portion of a plant lot having a quantity not to exceed 1250 tons. When production exceeds a 1250 ton sublot, and the excess is not greater than 150 tons, the excess will be incorporated into the previous sublot.

Quality control sampling and testing are not required on the first or last 150 ton portion of a sublot, providing the sublot quantity is greater than 300 tons. If a plant lot consists of only one sublot and the quantity is not greater than 300 tons, the quality control sample shall be obtained from the sublot portion greater than 150 tons.

When production stops before a sublot sample is obtained, the untested sublot quantity will be incorporated into the next sublot. If there is no subsequent sublot, the quantity will be incorporated into the previous sublot. If there is no subsequent or previous sublot to incorporate into, the untested sublot quantity shall be considered a plant lot and the final Quantity Adjustment Factor for that amount shall be 1.00. Untested sublot quantities will not be incorporated into any subsequent or previous days plant lot production.

When production stops after a sublot sample is obtained and the quantity is less than 1250 tons, it is still considered a sublot.

Hot mix asphalt production without the required quality control testing is allowed to be certified for daily plant lot quantities of 150 tons or less. These certified plant lot quantities will have a final Quantity Adjustment Factor of 1.00. All certified production shall meet the requirements outlined in this specification.

When the anticipated daily plant lot quantity is between 150 tons and 500 tons, the final Quantity Adjustment Factor will be 1.00 providing the required quality control sample yields a Quantity Adjustment Factor of 0.90 or greater. If the required test result yields a final Quantity Adjustment Factor greater than 1.00, the actual Quantity Adjustment Factor will be used. If the required test result yields a final Quantity Adjustment Factor less than 0.90, the subject production will be evaluated in accordance with procedures outlined in §402-4, Method of Measurement. The Manufacturer must notify the Regional Materials Engineer prior to any production of this type.

402-3.04 Quality Control Sampling and Testing. Quality control samples shall be obtained as outlined in NYSDOT Materials Procedure 94-04, Testing Frequencies Using Random Sampling at a Hot Mix Asphalt Plant.

Quality control sampling and testing shall be performed by Quality Control Technicians meeting the requirements outlined in §402-3.01 B. 2, Quality Control Technician.

Quality control testing procedures will be verified by the Department on a random basis by split sample testing. The Manufacturer's quality control samples shall be split into two representative samples and individually tested by the Manufacturer and the Department. The Department's test results will be compared to the Manufacturer's test results.

When the split sample test results are within the allowable tolerances as outlined in Table 402-1, Allowable Testing Tolerances, the Manufacturer's quality control test results representing the daily plant lot quantity will be used to determine the final Quantity Adjustment Factor.

When the test results of the split sample exceeds the allowable tolerances, retesting of the subject material shall be performed. When the test results of the retest split sample are within the allowable tolerances, the Manufacturer's quality control test results representing the plant lot will be used to determine the final Quantity Adjustment Factor.

When the test results of the retest split sample exceeds the allowable tolerances, production for Department projects shall be terminated and all the Manufacturer's quality control test results representing the production up to this point will be used to determine the final Quantity Adjustment Factor. Production for Department projects will not be allowed until the Regional Materials Engineer is satisfied that the cause of the verification problem has been resolved.

TABLE 402-1
ALLOWABLE TESTING TOLERANCES

Test Property	Tolerance	
	Within Lab	Lab to Lab
Gradation ≥ # 40 Sieve	± 5.0 %	± 7.0 %
Gradation < # 40 Sieve	± 2.0 %	± 3.0 %
Bulk Specific Gravity	± 0.020	± 0.028
Maximum Specific Gravity	± 0.011	± 0.019

Retesting of split samples shall be performed on the day the plant lot material was produced or delivered. If production has been terminated for any reason, the retesting shall be performed during initial production of the next plant lot. When there is no future production, the subject material shall be considered a plant lot and the final Quantity Adjustment Factor shall be 1.00.

During the required quality control sampling and testing, the Manufacturer shall obtain a hot bin or composite aggregate split sample representative of the quality control sample. A minimum of one aggregate split sample shall be obtained per day for each mix type produced. The aggregate split sample shall be reduced to testing size, identified and retained at the production site for a minimum of ten production days. The retained aggregate split samples shall be identified as to plant lot, sublot, and mix type. Hot bin aggregate samples shall be packaged separately by hot bin and retained together. Composite aggregate samples shall be dried before packaging.

All required compacted hot mix specimens, including the maximum specific gravity samples shall be retained at the production site for a minimum of ten production days. The compacted specimens and gravity samples shall be identified as to the plant lot, sublot, and mix type. The compacted specimens and the gravity samples shall be air dried and packaged.

All retained aggregate samples, compacted specimens and gravity samples may be discarded at the end of the specified time period, unless otherwise directed by the Regional Materials Engineer.

The Department reserves the right to witness any or all quality control sampling and testing, and test any or all retained samples for specification conformance.

Sampling and testing shall be performed using test procedures and frequencies outlined in the following Table 402-2, Quality Control Sampling and Testing.

TABLE 402-2
QUALITY CONTROL SAMPLING AND TESTING

Test Property	Sample Location	Test Method	Quality Control Frequency
Aggregate Gradation	NYSDOT MM 5.0	AASHTO T27 MM 5.0	(1)
Aggregate Moisture (2)	NYSDOT MM 5.0	NYSDOT MM 5.0	1 Every other Sublot Minimum 2 Per Day
Air Voids Plant Mixture (3)	NYSDOT MM 5.0	AASHTO T166 & T209 MM 5.13M / MM 5.16M	1 Per Sublot
Wet Analysis Minus #200 sieve	(4)	AASHTO T11	1 Per Week
Plant Mixture Moisture (2), (5)	NYSDOT MM 5.0	NYSDOT MM 5.0	As Required
Plant Mixture Temperature	Plant and Haul Vehicle	N/A	Routinely, Minimum 4 Times Per Day
Plant Mixture Asphalt Content	NYSDOT MM 5.0	NYSDOT MM 5.0	Routinely, Minimum 4 Times Per Day/Mix
RAP Moisture	NYSDOT MM 5.0	NYSDOT MM 5.0	2 Per Week
RAP Extraction	NYSDOT MM 5.0	NYSDOT MM 5.0	2 Per Week
Asphalt Cement Sampling (6)	NYSDOT MM 5.0	N/A	2 Per Day
Friction Aggregate Sampling	NYSDOT MM 5.0	NYSDOT 703-14GM	As Noted on JMF

(1) Volumetric design mixes - one test every other sublot, minimum one per day.
Non -Volumetric design mixes - one test every sublot.
(2) Required for drum mix plant only.
(3) Required for volumetric design mixes.
(4) Batch plant hot bins and drum mix plant composite sample.
(5) Required for batch and drum mix plants when producing recycled mixes.
(6) Department will be responsible for sample submission.

QUALITY CONTROL ASPHALT CONCRETE PRODUCTION

A. Sampling. Quality control samples for aggregate and hot mix asphalt shall be obtained randomly using the procedures outlined in NYSDOT Materials Procedure 94-04, Testing Frequencies Using Random Sampling at a Hot Mix Asphalt Plant. Other required quality control samples shall be obtained as outlined below in B., Testing, and Table 402-2, Quality Control Sampling and Testing.

B. Testing. The Manufacturer shall perform all quality control testing as outlined below:

1. Aggregate Gradation. The aggregate gradation analysis shall be determined using the procedures outlined in NYSDOT Materials Method 5.0, Plant Inspector's Manual for Bituminous Concrete Mix Production. Aggregate gradations for any mix type are considered in control when all quality control sieve test values remain within the Job Mix Formula tolerances.

a. Volumetric Design Mixes. An aggregate gradation analysis shall be performed every other sublot of hot mix asphalt produced. A minimum of one analysis per day shall be performed for each mix design produced.

b. Non-Volumetric Design Mixes. An aggregate gradation analysis shall be performed every sublot for each hot mix asphalt mix design produced.

2. Determination of Material Finer than the No. 200 Sieve. Material finer than the No. 200 sieve shall be determined in accordance with the procedures outlined in AASHTO T11, Standard Test Method for Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing. The material finer than the No. 200 sieve shall be determined for each production plant a minimum of one per week. The analysis shall be performed on the batch plant fine hot bin and the drum mix plant composite sample. Sampling of batch plant coarse aggregate hot bins will be required and/or the testing frequency modified for the fine hot bin if deemed necessary by the Regional Materials Engineer.

3. Air Void Analysis - Volumetric Design Mixes. Air void analysis shall be determined for each sublot of volumetric design hot mix asphalt produced. The Air void analysis shall be determined on the hot mix asphalt obtained from the haul vehicle. When hot mix asphalt holding bins are used for standard storage times as outlined in §401-3.03, Hot Bituminous Mixture Holding Bins, the air void analysis shall be determined after the storage time. The air void analysis shall be determined using the procedures outlined in NYSDOT Materials Method 5.13M or 5.16M. The Materials Method used will depend upon the type of mix design specified in the Contract Proposal. In conjunction with the air void analysis, the Voids in Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA) shall be determined.

4. Determination of Asphalt Content. The asphalt content shall be determined using the procedures outlined in NYSDOT Materials Method 5.0, Plant Inspector's Manual for Bituminous Concrete Mix Production. The asphalt content shall be calculated during initial production and then routinely throughout production a minimum of four times per day per mix type.

5. Mixture Temperature. The mix temperature shall be determined at the beginning of production with the first or second haul vehicle and then routinely throughout the production day. A minimum of four temperatures shall be determined per day independent of mix type. The temperature shall be transmitted to the project paving site with the haul vehicle delivery ticket. When hot mix asphalt holding bins are loaded for storage, the mix temperature shall be determined routinely throughout the loading time.

6. Aggregate and Mix Moisture Content (Drum Mix Plant). The aggregate and hot mix asphalt moisture shall be determined using the procedures outlined in NYSDOT Materials Method 5.0. The composite aggregate moisture content shall be determined during initial daily production and then mid-way throughout the production day. A minimum of two aggregate moisture contents shall be determined per day. The hot mix asphalt moisture content shall be determined as deemed necessary by the Regional Materials Engineer.

7. Asphalt Cement Sampling. The Manufacturer shall obtain samples of the asphalt cement in accordance with the procedures outlined in NYSDOT Materials Method 5.0. A minimum of two samples shall be obtained each production day. All samples shall be appropriately identified and stored at the facility site. Sample containers, documentation and submission of the samples will be the Department's responsibility.

8. Friction Aggregate. The friction coarse aggregate must meet the requirements outlined in §401-2.03 A., Coarse Aggregates. The Manufacturer shall perform friction coarse aggregate sampling and testing using procedures outlined in NYSDOT Materials Method 5.0 and NYSDOT Test Method 703-14GM, Percentage of Non-Carbonate Particles in a Coarse Aggregate Mixture. The friction coarse aggregate test procedure shall be performed at the production facility at frequencies noted on the Job Mix Formula.

9. Recycle Mixes. The Manufacturer shall perform all sampling and testing of recycle design hot mix asphalt using procedures outlined in NYSDOT Materials Method 5.0. Quality control testing frequencies for recycle mix production shall be followed as outlined in §402-3.04, Quality Control Sampling and Testing, except the following tests shall be performed at frequencies outlined in NYSDOT Materials Method 5.0 and Table 402-2, Quality Control Sampling and Testing.

a. RAP Moisture Test
b. RAP Extraction Test
c. Recycle Mix Moisture Test

C. Air void and Gradation Reporting. Air void control test values shall be calculated to the nearest 0.001 of a percent and reported to the nearest 0.01 of a percent. Aggregate gradation control test values shall be calculated to the nearest 0.01 of a percent and reported to the nearest 0.1 of a percent. When determining test result acceptability, the air void test value shall be referenced to the mix design median of 4.00 percent and the gradation test value referenced to the Job Mix Formula target value.

D. Sampling and Testing Disputes. When sampling and testing disputes occur, the Department will perform referee sampling and testing. Referee samples will be obtained randomly and independently from the quality control samples and tested at the Regional or Central Office laboratory. If production has been terminated, the Manufacturer's retained samples representing the disputed plant lot will be tested. The Department's independent referee test results are final and will be used to determine the final Quantity Adjustment Factor for the disputed quantity and the acceptance of the in place production material.

402-3.05 Production Control. Hot mix asphalt production is considered in control when all required testing indicates conformance with the requirements outlined in this specification and all quality control calculations yield a final Quantity Adjustment Factor of 0.90 or greater.

Hot mix asphalt production is considered out of control when any required testing is not in conformance with the specification requirements and/or any quality control calculation yields a final Quantity Adjustment Factor less than 0.90. When production is out of control, the Manufacturer has the option to:

A. Perform additional quality control sampling and testing.

B. Make adjustments to the production process.

C. Terminate Department production.

When additional quality control sampling and testing is performed, the additional test values will be included with the required quality control test values to calculate the final Quantity Adjustment Factor.

During the production process, all mix design target values must be strived for. When test values consistently fall outside the allowable production tolerances, corrective actions must be taken. Target value adjustments are allowed providing the adjustments are properly documented in the plant diary and the Regional Materials Engineer is notified prior to production of the next adjusted sublot.

The adjusted aggregate or asphalt content target value is not allowed to exceed the Specification General Limit. The aggregate gradation production tolerance is allowed to exceed the Specification General Limits. Changes to any volumetric design will only be allowed providing all specified volumetric mix properties remain within the specification production limits.

When production is terminated, the hot mix asphalt quantity produced up to that point will be considered a plant lot and the final Quantity Adjustment Factor will be determined using the required quality control test values and all additional test values obtained from the terminated plant lot.

When the daily final Quantity Adjustment Factor of any mix type is less than 0.90 for two consecutive production days, corrective actions must be taken. If by the end of the third production day, corrective actions did not yield a daily final Quantity Adjustment Factor of 0.90 or greater, Department production shall be terminated.

When production is terminated for any reason, the Manufacturer shall then demonstrate by trial production that the production process is back in control. When trial production is supplied to Department projects it will be evaluated as outlined in §402-4, Method of Measurement.

Hot mix asphalt contained in storage that represents any terminated plant lot is considered unacceptable for Department projects.

When any production is terminated, the Manufacturer will immediately notify the Department's Engineer-in-Charge and the Regional Materials Engineer.

402-3.06 Production Quantities. The Manufacturer shall notify the Regional Material's office by 3:00 PM on the day before any production for the Department.

Production quantities will be adjusted based on hot mix asphalt production performance. Production quantities will be adjusted based on the final Quantity Adjustment Factor obtained from either Table 402-3, Air Voids in Plant Mixture(Volumetric Designs) or Table 402-4, Percent Passing(Non-Volumetric Designs). Adjusted production quantities will be determined as outlined in §402-4, Method of Measurement.

The Manufacturer will document all daily production quantities for each hot mix asphalt mix design produced and transmit daily these quantities to each project, using NYSDOT Form BR-307. NYSDOT form BR-307 acknowledges that the hot mix asphalt Manufacturer supplied each Department project with specification conformance material. The plan administrator or authorized representative must sign the Certification form. The original must be sent to the Project Engineer and a copy retained at the production facility. All production quantities shall be transmitted to Department projects no later than one day following the corresponding delivery.

402-3.07 Documentation. The Manufacturer will maintain at each plant facility all process control test data. The test data must be kept in a ringed type book and stored in the production facility laboratory. Test data must be updated in this book within 24 hours following each plant lot production. As a minimum, the book must contain the control plan, job mix formulas, design target values, test data summaries, and daily production quantities. All forms, except control charts will be supplied by the Department. Test data must be documented on NYSDOT Form BR-331, Production Summary Sheet. A separate Production Summary Sheet will be used for each mix design produced. All production process control actions shall be outlined in the plant diary. A summary of all test data shall be transmitted weekly to the Regional Materials Engineer.

A copy of the plant automation printout for each mix type produced shall be kept at the plant facility site and must be available for review at all times.

Air void control charts shall be plotted for each volumetric mix type and posted in the laboratory or kept in a separate book. All control charts must be updated within a 24 hour period. As a minimum, the following shall be documented:

A. Date and time of test sample
B. Gradation analysis
C. Wet analysis of material finer than No. 200 sieve
D. Air void analysis
E. Aggregate and hot mix asphalt moisture content
F. Asphalt content
G. Production mix temperature
H. Lot and sublot identification
I. Random sample test location
J. Production quantities (BR-307)
K. Friction aggregate test results
L. Voids in Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA)

402-4 METHOD OF MEASUREMENT. The provisions of §401-4, Method of Measurement shall apply except as modified below:

The Manufacturer will determine on a daily basis the quantity of each plant lot produced. The quantity shall be measured by the number of actual tons produced at the plant facility. The quantity shall be determined from the automated proportioning system or the delivery vehicle weigh system. The quantity shall be measured or calculated based on the measured amount and reported to the nearest 0.01 of a ton.

The Department will determine the daily final Quantity Adjustment Factor for each mix design produced from either Table 402-3, Air Voids in Plant Mixture (Volumetric Designs) or Table 402-4, Percent Passing (Non-Volumetric Designs). The final Quantity Adjustment Factor will be used to adjust the daily production payment quantity.

Plant production payment quantities for volumetric design mixtures will be adjusted based on plant mixture air voids. Plant production payment quantities for non-volumetric design mixtures will be adjusted based on plant mixture aggregate gradation.

The final Quantity Adjustment Factor for volumetric design mixtures shall be obtained from Table 402-3, Air Voids in Plant Mixture. When hot mix asphalt holding bins are used for volumetric design mixtures, the final Quantity Adjustment Factor for the stored mixture shall be determined on the day of delivery.

The final Quantity Adjustment Factor for non-volumetric design mixtures will be calculated for all Job Mix Formula sieves having design target values less than 90 percent passing. The final Quantity Adjustment Factor for non-volumetric design mixtures shall be the lowest factor obtained from Table 402-4, Percent Passing, unless each individual Quantity Adjustment Factor is 1.00 or greater. If each individual Quantity Adjustment Factor is equal to or greater than 1.00, the highest calculated Quantity Adjustment Factor will be used.

When the final Quantity Adjustment Factor for any plant production material is less than 1.00, the Contractor has the option to remove and replace the subject material at no cost to the Department or agree to accept the resulting reduction in payment.

When the final Quantity Adjustment Factor for any plant production material is less than 0.90, the subject material will be evaluated by the Department to determine if it will be left in-place. The type of material produced, the layer in which it was used and the location of use will be the primary considerations for determining whether the subject material is left in-place. If the subject material is left in-place, the adjusted payment quantity will be calculated using a Quantity Adjustment Factor of 0.85. If the subject material is not left in-place, it will be removed and replaced at no cost to the Department.

When material is removed and replaced by the Contractor, the final Quantity Adjustment Factor for the replaced material will be determined as outlined in this subsection.

The daily final Quantity Adjustment Factor will be transmitted by the Department to the Engineer-in-Charge on NYSDOT Form BR-343, Daily Hot Mix Asphalt Plant Report. The final Quantity Adjustment Factor will be applied to all daily project quantity deemed acceptable by the Engineer-in-Charge. The following formula will be used to determine the daily final adjusted payment quantity for each mix type produced and delivered to the project:

Adjusted Payment Quantity = Accepted Quantity x Final Quantity Adjustment Factor

The daily final Quantity Adjustment Factor will be calculated for all hot mix asphalt items specified in the contract documents regardless of pay unit.

Asphalt cement price adjustments will be based upon the adjusted payment quantity and not the actual quantity produced.

402-5 BASIS OF PAYMENT. The provisions of §403-5, Basis of Payment shall apply, except that the daily project quantity will be adjusted based on the final Quantity Adjustment Factor obtained from the procedures outlined in §402-4, Method of Measurement.

TABLE 402-3
AIR VOIDS IN PLANT MIXTURE (Volumetric Designs)

Quantity Adjustment Factor	Average Absolute Value of (Test Value - 4.0)
1.05	0.00 - 0.17
1.04	0.18 - 0.33
1.03	0.34 - 0.50
1.02	0.51 - 0.67
1.01	0.68 - 0.83
1.00	0.84 - 1.00
0.99	1.01 - 1.10
0.98	1.11 - 1.20
0.97	1.21 - 1.30
0.96	1.31 - 1.40
0.95	1.41 - 1.50
0.94	1.51 - 1.60
0.93	1.61 - 1.70
0.92	1.71 - 1.80
0.91	1.81 - 1.90
0.90	1.91 - 2.00
0.85 (1)	over 2.00

(1) Refer to §402-4, Method of Measurement.

TABLE 402-4
PERCENT PASSING (Non - Volumetric Designs)

Quantity Adjustment Factor	Average Absolute Value of (Test Value - JMF Target Value)		
	Sieve Size # 40 and Larger	Sieve Size # 80	Sieve Size # 200
1.05	0.0 - 0.8	0.0 - 0.5	0.0 - 0.3
1.04	0.9 - 1.5	0.6 - 1.0	0.4 - 0.5
1.03	1.6 - 2.3	1.1 - 1.5	0.6 - 0.8
1.02	2.4 - 3.0	1.6 - 2.0	0.9 - 1.0
1.01	3.1 - 4.5	2.1 - 3.0	1.1 - 1.5
1.00	4.6 - 6.0	3.1 - 4.0	1.6 - 2.0
0.99	6.1 - 6.3	4.1 - 4.2	2.1
0.98	6.4 - 6.6	4.3 - 4.4	2.2
0.97	6.7 - 6.9	4.5 - 4.6	2.3
0.96	7.0 - 7.2	4.7 - 4.8	2.4
0.95	7.2 - 7.4	4.9 - 5.0	2.5
0.94	7.5 - 7.8	5.1 - 5.2	2.6
0.93	7.9 - 8.1	5.3 - 5.4	2.7
0.92	8.2 - 8.4	5.5 - 5.6	2.8
0.91	8.5 - 8.7	5.7 - 5.8	2.9
0.90	8.8 - 9.0	5.9 - 6.0	3.0
0.85 (1)	over 9.0	over 6.0	over 3.0

(1) Refer to §402-4, Method of Measurement.

QUALITY CONTROL ASPHALT CONCRETE PRODUCTION

ATTENTION

The Contractor is advised that this Contract Proposal contains a specification, **Section 402 Quality Control Asphalt Concrete - General,** which is a Quality Control performance-related specification by which the contractor, through the hot mix asphalt manufacturer, is responsible for all Quality Control activities relating to the production of hot mix asphalt. The hot mix asphalt manufacturer is required to perform and document all Quality Control sampling and testing activities in accordance with procedures outlined by the Department. These procedures are available through the Regional Materials Section or the Central Office Materials Bureau.

The contractor shall also be aware this specification contains Quantity Adjustment Factors for all hot mix asphalt pay items. The **Quantity Adjustment Factor Conversion Table** below incorporates phase-in factors that will be applied during each noted Calendar year when calculating the daily payment quantities of hot mix asphalt production supplied to Department projects.

The Quantity Adjustment Factors specified in **Section 402, Tables 402-3 and 402-4,** shall be changed accordingly. However, all Quantity Adjustment Factors listed in **Section 402** that are used for process control and acceptance shall not be changed and shall be referenced to the original specified factors.

Quantity Adjustment Factor Conversion Table

Phase-in Quantity Adjustment Factors				
Specified in Tables 402-3 and 402-4	Calendar Year Production			
	1997	1998	1999	2000
1.05	1.05	1.05	1.05	1.05
1.04	1.04	1.04	1.04	1.04
1.03	1.03	1.03	1.03	1.03
1.02	1.02	1.02	1.02	1.02
1.01	1.01	1.01	1.01	1.01
1.00	1.00	1.00	1.00	1.00
0.99	1.00	1.00	0.995	0.99
0.98	1.00	1.00	0.990	0.98
0.97	1.00	1.00	0.985	0.97
0.96	1.00	1.00	0.980	0.96
0.95	1.00	1.00	0.975	0.95
0.94	1.00	1.00	0.970	0.94
0.93	1.00	1.00	0.965	0.93
0.92	1.00	1.00	0.960	0.92
0.91	1.00	1.00	0.955	0.91
0.90	1.00	1.00	0.950	0.90
0.85 (1)	0.85 (1)	0.85 (1)	0.85 (1)	0.85 (1)

(1) Refer to §402-4, Method of Measurement.