

Tennessee Department of Transportation Division of Materials and Tests

Aggregate Approval Process

Purpose- The purpose of this document is to establish a formal process for evaluating, testing, and approving aggregate sources to be used for general TDOT Construction and bituminous surface course mixtures.

Background- Aggregates must exhibit certain physical and chemical properties that reflect their ultimate quality and durability. The TDOT Standard Specifications have several aggregate properties specified, including abrasion resistance, freeze-thaw durability, gradation, particle shape, deleterious materials, and others. Aggregates used for bituminous surface courses must demonstrate additional properties that would indicate the aggregates ability to satisfactorily provide a skid-resistant pavement. These properties would include silica dioxide content, insoluble residue content, calcium carbonate content, British pendulum numbers, and others.

Procedure- A new aggregate source shall complete the following procedure to be considered for use in TDOT work. In addition, an aggregate facility must provide a Type A laboratory as specified in subsection 106.06 of the TDOT Standard Specifications.

Step 1- The aggregate producer/supplier shall submit test results from an independent laboratory indicating the sources ability to meet current TDOT Standard Specifications.

Step 2- A representative from the TDOT Materials and Test Division will visit and inspect the site to determine geological formations, and obtain samples for TDOT testing.

Step 3- The TDOT results will be provided to the producer. It will be the producer's decision to continue processing aggregate for final use.

Step 4- Acceptance of the aggregate for use in a TDOT project will be based on the chemical and physical properties of the processed material for its intended use. (i.e. base stone, concrete coarse aggregate, etc...) All sampling and testing will be in accordance with the TDOT Standard Specifications, TDOT Materials and Tests Circular Letters, and AASHTO/ASTM Testing procedures.

Aggregate sources will be continuously sampled and tested for quality (chemical and physical properties) by the TDOT. Aggregate that does not meet TDOT specifications will not be used in TDOT work.

An aggregate that is to be tested for use in a bituminous surface course must not only meet the requirements of the TDOT Standard Specifications, but also demonstrate satisfactory field performance. To become an approved bituminous surface course aggregate, the source must:

Step 1- Same as above

Step 2- Same as above

Step 3- Same as above

Step 4- Same as above

Step 5- Based on the chemical and physical properties, the producer must identify the TYPE of aggregate for which he requests approval. Current TYPE requirements and limitations are listed in TABLE 1.

	Type I	Type II	Type III	Type IV
Traffic use	All roads	All roads	15,000 ADT max.	5,000 ADT max.
Silica Dioxide (ASTM C-25)	40% min.	30% min.	20% min.	10% min.
Acid Insoluble Residue (ASTM D 3042)	50% min.	35% min.	25% min.	
BPN 9 (AASHTO T-278, T-279)	30 min.	30 min.	25 min.	22 min.
TTTCM (TTU method)				42.5 min.
Calcium Carbonate	32 % max.			
Test Section for Approval		20,000 ADT min. for 2 years, OR 7.3 million vehicle passes per test lane for min. 2 years (4-lane rural interstate, max. ADT 35,000 allowable)	20,000 ADT min. for 2 years, OR 7.3 million vehicle passes per test lane for min. 2 years (non-interstate)	10,000 ADT min. for 2 years, OR 3.65 million vehicle passes per test lane for min. 2 years (non-interstate)

TABLE 1
BITUMINOUS SURFACE AGGREGATE REQUIREMENTS (Subsection 903.11(c))

Step 6- Material which has been laboratory tested and conforms to the chemical and physical properties of TABLE 1 and Subsection 903.11(a) of the Standard Specifications must then demonstrate satisfactory field performance.

Step 7- The aggregate producer, with TDOT assistance, will be responsible for identifying an existing or proposed project for a test strip location. The test strip shall be with-in the traffic range identified in TABLE 1 for the TYPE of aggregate which approval is being requested. Traffic ranges shown are for two lane roadways. Since it may be difficult to identify two lane roads with ADT volumes shown, the outside lanes of rural 4-lane roadways will be considered, provided the minimum number of vehicle passes are obtained in that lane. The number of vehicle passes will be calculated by assuming the outside lane will receive 30% of the ADT.

Step 8- The aggregate producer will be responsible for coordinating the test section with the prime contractor. No additional payment will be made for the test section or other costs associated with the Test Section. Coordination will include the submittal of a bituminous mixture design by a TDOT certified technician, and appropriate contract Supplemental Agreements or change orders.

Step 9- Once the bituminous mixture design is approved the test strip may be constructed in accordance with TDOT Standard Specifications and Contract requirements. The test section shall be 0.5-0.6 mile in length in each direction.

After the test strip is completed, the TDOT will conduct periodic friction tests to determine the actual in place performance. If the test section demonstrates a frictional value greater than 40* after a minimum two year test period, that source material will be considered acceptable. When the total number of vehicle passes must be met, a test strip may need to be in place for more than 2 years.

(* Tested in accordance with AASHTO T-242, a test will be performed each 0.1 mile (minimum 5 per direction) with no individual test below 40)

EXAMPLES --

A Type III aggregate is to be tested on a 4 lane rural roadway with an ADT of 18,000.

- 7.3 Million vehicle passes are required. (from TABLE 1)
- 18,000 ADT x 0.30 for outside lane = 5400 ADT in the outside lane
- 7,300,000 vehicle passes ÷ 5400 vehicles per day = 1352 days = 3.70 years = ~ 3 years and 8 months

A Type II aggregate is to be tested on a rural 4 lane interstate with an ADT of 30,000.

- 20,000 ADT required from TABLE 1,
- 2 years minimum test section

Quality Monitoring-

A bituminous surface aggregate's approval is contingent based on continuous, satisfactory field performance.

- Once every six months, a sample of the approved material shall be obtained from the source stockpile by Regional Materials and Tests personnel and submitted to the headquarters materials testing laboratory for a complete verification of surface aggregate properties.
- If a sample that has been submitted and testes fails to meet any of the approval criteria, then a second "referee" sample of the same material shall be obtained for testing. When two subsequent samples fail quality testing, the aggregate source's approval for use shall be immediately rescinded and mix production utilizing the failing material shall cease.
- The producer shall be notified of the failing test results as soon as possible; at which time the producer, Regional materials and Tests, and Headquarters Materials and Tests will hold a conference to identify the location/distribution of the failing material and to develop a plan for the acceptance of newly produced material.
- Once a new stockpile of material is produced, a sample of the material shall be tested for surface aggregate approval by a private testing laboratory at the producer's expense.
- If the material tested by a private laboratory meets the specifications for an approved surface aggregate, then a sample of the same material shall be obtained by Regional Materials and Tests personnel and submitted to the headquarters materials testing laboratory for a complete verification of surface aggregate properties.
- Once it has been demonstrated that the material meets TDOT surface aggregate approval specifications, Headquarters materials and Tests shall notify both regional TDOT personnel and the producer.