

ALDOT-420-05
ACCEPTANCE PROGRAM FOR TRAFFIC MARKING MATERIALS

1. Scope

- 1.1. The purpose of this procedure is to establish a uniform set of guidelines for the acceptance by the Department and quality control by a Producer of traffic marking materials and establish guidelines for training and certification of both technicians and laboratories involved with the testing of these materials. The procedure outlines accepted methods to be followed by the Project Engineer, Contractor and Producer. This procedure applies to all Producers of both temporary and permanent traffic marking materials as well as glass beads for projects in Alabama. Participation in an ALDOT Sampling Proficiency Program for thermoplastic material, and the AMRL Sampling Proficiency Program for paint, with periodic inspection by ALDOT personnel, is required and will enhance a laboratory's ability to meet those requirements described herein.

2. Definitions

- 2.1. Traffic Marking Materials – Standard Thermoplastic (Class 2), Thin Film Applied Thermoplastic (Class 2T), and Traffic Line Paint (Class 1, & 1H), Tape (Class 3), Warranted Traffic Marking Materials, Drop On Glass Beads (Type 1, 2, 3, & 4)
- 2.2. Department - Alabama Department of Transportation (ALDOT).
- 2.3. Bureau - Bureau of Materials and Tests.
- 2.4. Materials and Tests Engineer - The Chief of the Bureau of Materials and Tests.
- 2.5. Producer - This term includes individual manufacturers supplying traffic marking materials or glass beads for Department projects. Each facility that produces a different product (marking material or glass beads) will be treated as a separate entity even when owned by the same parent company.
- 2.6. Contractor – the Company responsible for placement of the traffic marking materials at the project.
- 2.7. BMT-177- "Participation Agreement" form. Executed between the Department and Producers of traffic marking materials. Producer agrees to abide by Departmental requirements and the Department in turn allows the Producer to sell products for Department projects.

- 2.8. BMT-178 - "Traffic Marking Materials Certificate of Compliance" form. Producer executes form with each shipment slated for Department projects verifying compliance with Department specifications and procedures. This form serves as project acceptance certificate.
- 2.9. BMT-179- "Notification to Suspend Shipment of Traffic Marking Materials" The Department will execute this form when traffic marking materials fail to meet Department specification and/or producer fails to follow Department specifications and/or procedures.
- 2.10. BMT-180- "Report on Analysis of Traffic Marking Materials" This form is used for reporting the certified test results for each parameter listed in Table I, and Table II.
- 2.11. BMT-181- "Certified Technician Warrant" This document verifies that the technician has met all the requirements of the Department to certify and test traffic marking materials being shipped to projects.
- 2.12. AS&T - "Assurance Sampling and Testing" Those samples and tests performed during construction for determining if contract requirements are being fulfilled.
- 2.13. AMRL - AASHTO's Materials Reference Laboratory (AMRL) proficiency testing program allows individual laboratories to compare their results to a national average to determine if potential problems exist in their operation.
- 2.14. AASHTO R18 - Procedure for Establishing and Implementing a Quality System for Construction Materials Testing Laboratories.
- 2.15. Central Laboratory - The paint laboratory of the Bureau of Materials and Tests located at 3704 Fairground Road, Montgomery, AL 36110.
- 2.16. Category "A" Technician - A certified technician who performs tests on traffic marking materials as required by Table I, Traffic Line Paint (Class 1, & 1H), or Thermoplastic (Class 2, & 2T), Drop On Glass Beads (Type 1, Type 2, Type 3, & Type 4)

3. Qualification Program for Producer

- 3.1. The Department will establish and maintain lists (V-3, and V-4, "Materials, Sources, and Devices with Special Acceptance Requirements" manual) of Producers presently complying with this procedure. Producers classified as Class 1, Class 1H, Class 2, and Class 2T Class 3, Warranted Traffic Marking Materials or Drop On Glass Beads must be on the list in order for the department to use manufactured products on Department Projects. Materials for Class 1H, Class 2, and Class 2T must also meet the requirements of the

formulation tables in Section 856 of the Standard Specifications for the specific class of material.

- 3.2. Producers desiring to be placed on these lists must submit a written request on official company letterhead along with any applicable fees, as outlined in the "Materials, Sources, and Devices with Special Acceptance Requirements" manual and ALDOT 355. The Department will make an initial inspection of the facility to determine compliance with the minimum standards as outlined in Department specifications and those listed in this procedure. This inspection will be valid for a period of three years from the date of issuance.
- 3.3. Producers must comply with the following in order to sell to Department projects.
 - 3.3.1. Each producer shall execute a "Participation Agreement" form (BMT-177). This agreement must be executed by an officer of the company who has responsibility for the overall operation of the facility.
 - 3.3.2. Each Producer must furnish, equip, and staff a laboratory meeting the requirements of Section 10 capable of testing, within precision statement tolerances as defined in applicable ASTM or AASHTO test procedures, all the required parameters listed in Table I for Class 1, and 1H traffic line paint, Class 2 and Class 2T thermoplastic, Drop On Glass Beads (Type 1, 2, 3, & 4) and furnish the Department with a written Quality Control Plan. An acceptable Quality Control Plan should include what steps will be taken in case of equipment problems, loss of certified technician, etc. Exceptions to the Quality Control Plan may be allowed, with approval of the Materials and Tests Engineer for research, experimental projects, equipment problems, Fourier Transform Infrared (FTIR) testing, personnel problems, etc., on a project-by-project basis.
 - 3.3.3. All testing by the producer must be performed by technicians that have been certified by the Department as described in Section 11 or by technicians under the direct supervision of a Department certified technician. In addition, all testing must be done in a laboratory certified by the Department. The laboratory shall be located at the site of the facility. By exception, and only with written approval of the Materials and Tests Engineer, the testing laboratory may be located at a site other than the facility site and provide laboratory services for no more than two of the producer's manufacturing facilities.
 - 3.3.4. The producer shall furnish the following documents and materials to the Department:
 - 3.3.4.1. The Chemical Laboratory of the Testing Section of Materials and Tests Bureau will obtain an original white copy of the BMT-178, BMT-180, and a random sample of the traffic marking

material from the storage location for each batch of traffic marking material produced during the first week of each month. The material will be tested and approved for use on projects scheduled for the following month. Random samples from the contractor's storage location will be sampled via the sampling method in attachment A of this procedure.

3.3.4.2. Designated Storage facilities for traffic marking materials locations may not be located more than three hours (approximately 200 miles) travel by automobile from the Department's Central Laboratory.

3.3.4.3. All shipments of traffic marking materials to the project or contractor's plant shall be accompanied by both a BMT-178 and a BMT-180 for each batch in the shipment.

3.3.4.4. When a Contractor ships product to Department projects, one verification sample per week from any of the batches shipped shall be delivered to the Department's Central Laboratory.

3.3.5. All testing shall be in accordance with the current ASTM, AASHTO, or ALDOT procedures, as specified in the Department Specifications.

3.3.6. Each producer's facility must be recertified by the Department every three years. Periodic and unannounced inspections may be made at the producer's facility by Department inspectors. The producer will allow the inspector free access to all test records, production, storage, testing facilities, and shipping documents showing quantities of materials shipped.

4. Fees and Costs

4.1 All producers of traffic marking materials whose source locations are located more than eight hours travel by automobile or cannot be accessed by automobile from the Department's Central Laboratory will be required to pay for the Department's travel costs and transportation in addition to all applicable fees as required per ALDOT 355. This requirement will apply for initial evaluations and periodic inspections. Costs shall include meals, lodging, airfare and vehicle rental cost if required, and/or mileage rates if a Department vehicle is used. If multiple sources are evaluated and/or inspected on the same trip, all costs will be proportionally divided.

4.2. Payment for expenses shall be made by check, payable to the Alabama Department of Transportation prior to any visit or inspection.

4.3 Checks shall be submitted to:

Alabama Department of Transportation
Materials and Tests Engineer
3700 Fairground Road
Montgomery, AL 36110

5. Field Inspection and Verification

- 5.1 The Project Engineer shall consult the Department's Testing Manual for current information concerning field sampling of permanent traffic marking materials.
- 5.1.1 The Project Engineer shall verify that material on the jobsite matches the information shown on the BMT-178.
- 5.1.2 Shipments that obviously contain a product not meeting the requirements of Section 701 of the Standard Specifications shall be rejected.
- 5.1.3 The Project Engineer shall verify that Class 2 and Class 2T Thermoplastic Traffic Marking Material has been sampled and tested by the Department's Chemical Section and appears on the Department's Approved Traffic Marking Material spreadsheet, located on the Materials and Tests Bureau website.
- 5.1.4 Markings shall be stamped or sprayed on each bag, and shall be clearly legible and in permanent ink or paint. Producers will not be allowed to place numbers on bags with felt tip markers or other means by hand. Any evidence of tampering with the lot number on the bags will be considered as cause for rejection.
- 5.1.5 The only required markings for this procedure on each bag shall be as follows:
- 5.1.6 Company Name
- 5.1.7 Lot Number As Follows:

AL	01	01	4	01	Y
<u>State</u>	<u>Variable</u>	<u>Variable</u>	<u>Variable</u>	<u>Variable</u>	<u>Variable</u>
Designation	Month made	Day Made	Year made	Each 55,000 lbs. (25,000 kg) lot made that day if more than one is made	Y = Yellow W = White

6. Acceptance and Final Certification of Traffic Marking Materials

6.1 Materials may be accepted for payment on the job site when a BMT-178 has been received and acceptable application of the traffic stripe, or the traffic control markings and legends has been made and approved. These compliance forms will be used in lieu of test reports. The Department’s Approved Traffic Marking Material spreadsheet, located on the Materials and Tests Bureau website may also be used to further verify product laboratory testing approval.

7. Further Requirements of Producers

7.1 No Producer shall issue any "Traffic Marking Material Certificate of Compliance” (BMT-178) forms, unless the material is in full compliance with all requirements of the Department.

8. Failing Verification Test Results

8.1 In the event that Department test results fail to verify those results reported by the producer, the Department will initiate an investigation to determine cause as follows:

- 8.1.1 Department personnel will review the producer's weekly test results.
- 8.1.2 If necessary, Department personnel will obtain samples from either the contractor's storage facility or the producer’s facility, perform all required tests at the Central Laboratory and compare test results.
- 8.1.3 Department personnel will evaluate all test results.
- 8.1.4 If the investigation indicates that a product fails to meet the appropriate specifications, the materials fall under paragraph 9 (noncompliance) of this procedure

9. Noncompliance

9.1 Producers presently on List V-3 or V-4, “Materials, Sources and Devices with Special Acceptance Requirements” manual, who fail to comply with the above requirements, frequently fail to meet specifications, or fail to immediately correct

faulty material, will be removed from said approved List V-3 or V-4 for the product type in question. Producer will be notified of removal from List V-3 or V-4 by BMT-179, "Notification to Suspend Shipments of Traffic Marking Materials on BMT-178." In addition, the Department may take action under the provisions of Section 105 of the ALDOT Standard Specifications. Reinstatement of authority to ship by certification will occur after investigation by the Department at the producer's facility indicates noncompliance has been resolved.

10. Laboratory Certification

10.1 All producers of traffic marking materials that wish to have their products used on state and federal projects must participate in an ALDOT Proficiency Sampling Program with periodic inspections by ALDOT personnel. The ALDOT Proficiency Sampling Program will consist of each laboratory performing all required tests on a pair of proficiency samples annually. Each producer will submit either 100 pounds (thermoplastic) or 2 gallons (paint) of their product to the Central Laboratory each year. The Paint Laboratory will prepare a pair of proficiency samples and distribute these samples to all participating producer Laboratories for proficiency testing. The results of each test will be rated on a scale of 1 to 5. The ratings have no valid standing beyond showing the difference between the individual laboratory result and the average for a particular test. The following table details the relationship between the ratings and the averages.

RATINGS	RANGE (Number of Standard Deviations)
5	Less than 1
4	1 to 1.5
3	1.5 to 2
2	2 to 2.5
1	Greater than 2.5

The sign of the rating merely shows whether the result reported was greater or less than the average obtained.

10.2 All producers of traffic line paint materials that wish to sell their products for use on state and federal projects must participate in the AMRL Proficiency Sampling Program with periodic inspections by ALDOT personnel.

- 10.3 Traffic Marking Material testing laboratories are required to have all necessary equipment to perform required tests. All test equipment must be checked, verified, and/or calibrated at the frequency prescribed in AASHTO R18.
- 10.4 Bureau personnel will inspect and certify all traffic marking materials laboratories.

11. Certification for Category A Technicians

- 11.1 The producer shall make requests for technician certification to the Bureau by letter. The request shall include specific information such as experience, length of training, subject matter, instructors, location of training, and category of certification being requested.
- 11.2 Bureau personnel will monitor and observe all "hands-on" tests performed by the applicant. The technician will be allowed to use any notes, checklists, or specifications to perform the required tests. It will be the subjective opinion of the Bureau technician that determines whether or not a technician demonstrated the level of competency required for certification.
- 11.3 The producer's quality control plan shall identify alternatives for testing in the event of equipment failure and/or the loss of their certified technician. Generally, the producer will be allowed no more than 30 working days to overcome equipment and/or technician problems; however, the Materials and Tests Engineer has the discretion to consider special circumstances in enforcement of this provision.
- 11.4 Personnel meeting the requirements shall be certified by the Bureau Personnel monitoring and observing the above mentioned testing during the laboratory inspection. Certification is also contingent upon the technician signing a BMT-181, "Certified Technician Warrant."
- 11.5 A technician shall be certified for a period of three years. Recertification will require the submittal of a new request for technician certification as outlined in Section 11.1.
- 11.6 To satisfy the terms of the certification program, at least one technician must be certified per establishment. Technicians who are not certified may perform tests provided they are working under the direct supervision of a certified technician.
- 11.7 Technician Training
 - 11.7.1 Individual producers will be responsible to ensure their technicians are trained to perform all tests relating to traffic marking materials (see attached tables). The required training may be accomplished in-house, through academia, or through private companies.

12. Decertification of Certified Laboratories and Technicians

- 12.1 The Bureau Personnel shall review laboratories and/or personnel who fail to comply with the above requirements as discovered by a representative of the Bureau. Actions shall be implemented upon recommendations by the Working Task Force and will range from a minimum 60 day suspension to permanent revocation.

13. Working Task Force

- 13.1 The membership of the Working Task Force shall be comprised of the following:
- 13.1.1 Testing Engineer
 - 13.1.2 Assistant Testing Engineer
 - 13.1.3 Assistant Roadway Construction Engineer
 - 13.1.4 Industry Member, (Appointed by the Alabama Road Builders Assoc.)
- 13.2 The Working Task Force will meet on an as-needed basis to review laboratories and/or personnel who fail to comply with the above requirements.

Table I

METHODS OF TESTS		
Material	Test	Method to Use
Thermoplastic (Class 2 and 2T)	Binder Content Glass Beads Content Glass Beads Grading Analysis Softening Point Flowability Specific Gravity Heavy Metal Content	ASTM D 4797 ASTM D 4797 ASTM D 1214 ASTM D 36 AASHTO T 250 AASHTO T 250 EPA 3052, 6010B
Traffic Line Paint (Class 1)	Total Solids (Weight % Volatile Content) Viscosity Pigment: Water Based Solvent Based Drying Time Density Infrared	ASTM D 2369 ASTM D 562 ASTM D 3723 ASTM D 2371 ASTM D 711 ASTM D 1475 ASTM D 2743
Traffic Line Paint (Class 1H)	Volatile Compound Content (VOC) Viscosity Pigment: Water Based Drying Time Density Infrared	ASTM D 3960 ASTM D 562 ASTM D 3723 ASTM D 711 ASTM D 1475 ASTM D 2743
Drop On Glass Beads (Type 1, Type 2, Type 3, & Type 4)	Type 1 & 2: Roundness Crushing Resistance Refractive Index Gradation Type 3 & 4: Roundness Crushing Resistance Refractive Index Gradation Toxicity Heavy Metal Content	AASHTO M 247 AASHTO M 247 AASHTO M 247 AASHTO M 247 FLH T 520-93 AASHTO M 247 AASHTO M 247 FHWA FP-96 EPA 40 CFR 261.24 EPA 3052, 6010B
Tape (Class 3)	Tensile Strength Ultimate Elongation Retroreflectivity Whiteness Index Adhesion Skid Resistance Heavy Metal Content	ASTM D 3759 ASTM D 3759 ASTM E 1710 ASTM E 313 ASTM D 4505 ASTM D 4505 EPA 3052, 6010B

<p>Preformed Thermoplastic</p>	<p>Softening Point Bead Content and Grading Low Temperature Stress Resistance Impact Resistance Daylight Reflectance Yellowness Index Color Whiteness Index Heavy Metal Content</p>	<p>AASHTO T 250 AASHTO T 250 AASHTO T 250 AASHTO T 250 AASHTO T 250 AASHTO T 250 AASHTO T 250 ASTM E 313 EPA 3052, 6010B</p>
<p>Warranted Traffic Marking Materials</p>	<p>Material certification for all test parameters required for the warranted product.</p>	

Note 1: Other tests may be required at the discretion of the Materials and Tests Engineer.

Note 2: All samples forwarded to the Department will be accompanied by a Certificate of Analysis (BMT-180) if from a manufacturing facility.

Note 3: All testing and equipment will be in compliance with the methods listed in Table 1.

Table-II

Manufacturer (Complete Analysis)			
Forward sample and attach certificate of its analysis as given below.			
Material	Tests	Size of Sample	Frequency
Thermoplastic (Class 2 and 2T)	Binder Content Glass Beads Content Glass Beads Grading – Analysis Softening Point Flowability Specific Gravity	Submit 4 liters (1 gal.)	One per week representing material shipped
		Submit BMT-180 (Analysis)	
	Heavy Metal Content	Submit Certified Test Report	One per manufacturer's lot from a third party laboratory
Traffic Line Paint (Class 1) (Class 1H)	Total Solids Pigment Viscosity Drying Time Density Infrared	Submit 1 liter (1 qt.)	One per week representing material shipped
		Submit BMT-180 (Analysis)	
Drop On Glass Beads (Type 1, Type 2, Type 3, & Type 4)	Roundness Crushing Resistance Refractive Index Gradation Toxicity	Submit (1) 23 kg (50lbs) bag	One gradation per week representing material shipped, (roundness, crushing resistance, refractive index, and toxicity one per year)
		Submit BMT-180 (Analysis)	
	Heavy Metal Content	Submit Certified Test Report	One per manufacturer's lot from a third party laboratory
Tape (Class 3)	Tensile Strength Ultimate Elongation Retroreflectivity Whiteness Index Adhesion Skid Resistance	Submit 1 piece 6 Lin. Ft. (2 m) long	One per week representing material shipped.
		Submit Manufacturers Certification	
	Heavy Metal Content	Submit Certified Test Report	One per manufacturer's lot from a third party laboratory

Preformed Thermoplastic	Softening Point Low Temp. Stress Resistance Bead Contend and Grading Impact Resistance Daylight Reflectance Yellowness Index Color Whiteness Index	Submit 1 piece 6 Lin. Ft. (2m) long	One per week representing material shipped.
		Submit Manufacturers Certification	
	Heavy Metal Content	Submit Certified Test Report	One per manufacturer's lot from a third party laboratory
Warranted Traffic Marking Materials	Material certification for all test parameters required for the warranted product.		Submit BMT-180 or Manufacturers Certification

ATTACHMENT A

ALDOT THERMOPLASTIC COMPOUND SAMPLING

I. General

A. Equipment

1. Alabama Department of Transportation (ALDOT) Bureau of Materials and Tests (M&T) stamp, ink pad and suitable markers for identification.
2. Tape for sealing pallets of thermoplastic compound once sample has been obtained.
3. M&T forms, envelopes and tape for securing the sample container.
4. Approximately 3 feet (1meter) long, 2 inch diameter sample thief.
5. Unlined 1 gallon (3.8 liter) can.

B. Safety Precautions

It is the responsibility of the user of this sampling method to establish appropriate safety practices including (but not limited to) lifting heavy containers.

II. Sampling at the Contractor Storage Facility

A. Contractor Storage Facility Responsibilities

1. The Chemical Section of Materials and Tests Bureau will obtain an original white copy of the BMT-178, BMT-180, and a sample of the product from the storage location for each batch of traffic marking material produced during the first week of each month for testing and approval of traffic marking intended for use on the projects the following month.
2. Have the thermoplastic compound separated by manufacturer's lot number.
3. Provide access for Chemical Section Representative to easily obtain random samples.
4. Once the samples of thermoplastic compound are taken, have the warehouse personnel seal, stamp and mark each pallet of that lot with the Lot Number.
5. After approval of the thermoplastic compound, provide a Certificate of Delivery referencing the manufacturer's lot number.

B. Chemical Laboratory Responsibilities

1. Upon arrival at the warehouse, identify the thermoplastic compound by lot number not to exceed 44,000 pounds. (Same material included in manufacturer's lot.)
2. Randomly sample an approximately one gallon unit of thermoplastic compound per lot consisting of composite material thieved from three different randomly selected bags.
 - a. Randomly select three 50 pound bags from the lot to be sampled. The three bags can be left on the pallet or placed on a flat surface.
 - b. Carefully cut the bag at the top or at the bottom to allow the thieving device to be inserted into the selected bag.
 - c. Insert the thieving device into the bag and push through the entire length of the thermoplastic material bag.
 - d. Carefully remove the thieving device and empty the thermoplastic material that is retained in the pipe into the gallon can.
 - e. Repeat the process, pushing through a different area of the bag until approximately 3 pounds (1/3 of the gallon can) has been obtained.
 - f. Repeat steps 'b' through 'e' with the other two selected 50 pound bags selected for testing.
 - g. The final sample size should be one full gallon sized can (approximately 9-12 lbs of thermoplastic sample).
 - h. Label the outside of the 1 gallon can containing the sample with adequate identifying markings (manufacturer, product number, batch number, date of manufacture, and color)
3. Identify the sample of thermoplastic compound with the lot number used to designate the lot of which it is representative.
4. Test material samples to insure all testing requirements and specifications are met. Maintain spreadsheet listing passing/failing samples (by lot number and color) on the Bureau of Materials and Tests website.
5. For any lot of material not conforming to the specifications and receiving a failing report, the Chemical Section will return to the storage facility to ensure that the storage facility has marked the material appropriately and voided the lot number as approved product.

C. Form BMT-178 from the Warehouse

Upon receiving approval and a passing laboratory report from the Department's Chemical Section, submit with each lot of thermoplastic compound a BMT-178 to the project engineer and an additional copy to:

Bureau of Materials and Tests' Chemical Section
ATTN: Chemical Section Manager

The BMT-178 is invalid unless signed by an authorized representative of the company.