



AASHTO's National Transportation Product Evaluation Program

Quality Control Plan

Roadside Delineators & Workzone Channelizers (Drums)

Purpose- The purpose of this document is to establish the quality control procedures and requirements to conduct sampling and testing of Flexible Delineators and Work Zone Channelizer Drums.

Background- *General Facts about NTPEP Reports*

- NTPEP Reports contain data collected according to laboratory testing and field evaluation protocols developed through consensus-based decision by the AASHTO's NTPEP Committee. These test and evaluation protocols are described in the *Project Work Plan* found in the Appendix of this Report.
- Products are voluntarily submitted by manufacturers for testing by NTPEP. Testing fees are assessed from manufacturers to reimburse AASHTO member departments for conducting testing and to report results. AASHTO member departments provide a voluntary yearly contribution to support the administrative functions of NTPEP.
- AASHTO/NTPEP does not endorse any manufacturer's product over another. Use of certain proprietary products as "test control specimens" does not constitute endorsement of those products.
- AASHTO/NTPEP does not issue product approval or disapproval; rather, test data is furnished for the user to make judgment for product prequalification or approval for their transportation agency.

Guidelines for Proper Use of NTPEP Results

- The User is urged to carefully read any Introductory notes at the beginning of this Report. Also, to consider any special clauses, footnotes or conditions which may apply to any test reported herein. Any of these notes may be relevant to the proper use of NTPEP test data.
- The User of this Report must be sufficiently familiar with the product performance requirements and/or (standard) specification of their agency in order to determine which test data is relevant to meeting those qualifying factors.
- NTPEP test data is intended to be predictive of actual product performance. Where a transportation agency has successful historical experience with a given product it is suggested to factor that precedence in granting or withholding product approval or prequalification.

NTPEP Report Special Advisory for Temp. Traffic Control Devices (TTCD)

- For transportation agencies who desire to have *traffic control devices* periodically resubmitted for NTPEP evaluation, the Temporary Traffic Control Devices Technical Committee recommends that these products be required a re-test when their materials composition has changed, or when the original design has changed.
- The User is urged to establish quality assurance (QA) practices for project-level acceptance of products.
- For specific questions regarding this NTPEP Report or for advice on how to implement NTPEP data furnished in this Report the User is encouraged to contact the NTPEP Manager at (202) 624-7830 for a listing of NTPEP Lead States.

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Roadside Delineators & Workzone Channelize (Drums)

Roadside delineators are widely used to supplant pavement markings. They are a form of "traffic control device" as defined by the [MUTCD](#). Typically, roadside delineators are used on curvilinear sections of roadway, thereby enhancing the horizontal geometry so motorized vehicles may negotiate the curve. They are especially important roadway safety features during nighttime, or adverse weather, driving.

Roadside delineators may be flexible (plastics) or rigid (steel or aluminum). AASHTO/NTPEP only tests flexible roadside delineators. These may be either surface-mount or ground-mount style delineators. AASHTO/NTPEP conducts field performance testing, where a standard sedan impacts a test deck of delineators during summer and winter climate; the half year test constitutes a "test cycle." Also, laboratory testing is conducted on the sampled delineator specimens.

The national testing facility under AASHTO/NTPEP auspices is operated by Tennessee DOT. This is the same site used prior to NTPEP's inception under the SASHTO Regional Testing Facility.

Besides flexible delineators, NTPEP conducts field performance tests on workzone drums/barrels, which are commonly used in construction and maintenance workzones to delineate and "separate" the travel way from the workzone. Typical application of workzone drums is in a taper approaching when workzone. AASHTO/NTPEP initiates testing on workzone drums only in the winter/summer test cycle (not summer/winter cycle); industry recommended this cycle because it represented a more severe endurance test.

The NTPEP Technical Committee responsible for authoring the Project Work Plan convenes yearly at the NTPEP National (Annual) Meeting. During this working meeting, the Project Work Plan is discussed; changes made, and shortly thereafter balloted for adoption. Improvements are immediately implemented in the next available testing cycle. When compared to other standards development exercises, the NTPEP process is agile, effective and efficient. -NTPEP-

Flexible Delineators Surface and Ground Mount

Application: Application for NTPEP testing of traffic control devices under this program requires completion of all forms contained in the Product Evaluation Form (PEF), “General Notes” and “Fee Calculation Sheet.” Upon receipt of application by the NTPEP Coordinator, the Manufacturer will be notified with assigned “TTCD” tracking number.

Sampling Upon receipt of the application the Lead State Contact will make arrangements with the Manufacturer to have the following quantities of traffic control devices randomly sampled at the point of manufacture and/or distribution. The Lead State will contact the sampling state (email) to arrange the sampling of the product(s). The sampling information shall have manufacturer location (with in sampling state), sampling protocol and the manufacturers contact information. A packet containing the labels is sent (mailed) to the manufacturer with a label noting not to open until the sampling state representative is present. The sampling state representative will then select at random from the manufacturers stock 10 posts (for each product(s) and place a label on each one with their signature. The sampling is then complete. The manufacturer will then send the samples to the testing state.

The above sampling protocol was set up to insure that products evaluated are randomly selected from manufacturers' inventory by the sampling state.

Surface Mount Delineators The manufacturer shall supply 10 flexible surface mount delineators post (for each product to be evaluated) with the appropriate delineators or reflective sheeting attached to the post. The manufacturer shall supply the adequate quantity of materials to install the posts. The post shall be sufficient length so the reflector unit is approximately 36 inches above the surface it is mounted on. The flexible ground mounted delineator posts shall meet all requirements as set forth in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) as pertaining to such device.

Retroreflectorized sheeting shall be affixed to the post as recommended by the manufacturer. If there is no recommended sheeting, the manufacturer shall furnish the posts with 3" (wide profile) x 9" (length) retroreflectorized sheeting attached to the test samples. The sheeting shall be positioned ½" inch from the top of delineator.

Ground Mount Delineators The manufacturer shall supply 10 flexible ground mount delineators post (for each product to be evaluated) with the appropriate delineators or reflective sheeting attached to the post. The manufacturer shall supply the adequate quantity of materials to install the posts. The post shall be sufficient length so the reflector unit is approximately 48 inches above the near roadway edge when installed in the ground.

The flexible ground mounted delineator posts shall meet all requirements as set forth in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) as pertaining to such device.

Retroreflectorized sheeting shall be affixed to the post as recommended by the manufacturer. If there is no recommended sheeting, the manufacturer shall furnish the posts with 3" (wide profile) x 9" (length) retroreflectorized sheeting attached to the test samples. The sheeting shall be positioned ½" inch from the top of delineator.

Installation Manufacturers/Suppliers are required to install their products at the field test site during the dates and times designated by the NTPEP lead state

Test Procedure Sample size of ten units will be tested the following way: Eight flexible surface mounted delineator posts, installed by the manufacturer, will be hit ten times (four posts for glancing bumper hits and four posts for wheel hits) by a standard sedan with a bumper height of approximately 18" while traveling at a speed of 55 + 2 mph with five of the impacts at an ambient temperature of 32 + 5°F and the remaining five impacts at an ambient temperature of 85 + 5°F. The test vehicle shall impact four of the posts at an angle perpendicular to the front of the post and shall impact the remaining posts at an angle 25° clockwise from the angle perpendicular to the front of the posts. The same test samples will be used for the ten hits. Two posts will be used for weatherometer testing. A glancing bumper hit is defined as one on the bumper near the vehicle headlight. The delineators shall be installed a minimum of eight hours prior to being hit.

The vehicle used to perform test is a standard sedan from the testing states fleet the driver is trained and experience in the testing protocol.

Installation and Test Observations The testing agent will inspect each post after each impact and document the following:

1. Any splits, cracks, breaks or other forms of deformation or distress;
2. The percent list to vertical measured 120 seconds after each impact;
3. The approximate percentage of the reflective area that is damaged after each impact to an extent it no longer performs as intended;
4. Bonding agent used to install bases on the roadway surface and any problems or comments regarding the performance of the bases/bonding agent;
5. Any problems or comments associated with the installation and removal of the posts and bases. The testing agent will document any special equipment or techniques required to install or remove the posts and bases;
6. Any other problems or comments associated with the performance of each flexible surface mounted delineator post, which would be of interest to the member states.

All above test observations are perform by trained and experienced technicians. The approximate percent list to vertical is perform and checked after each reading the technician performing the measurement, then checked by the recorder and overviewed by the Technical Chairman.

Ultraviolet Resistance Test Procedure: Two posts will be tested initially for tensile strength and elongation according to ASTM D-638 and again after 1,000 hours QUV weatherometer exposure (ASTM G-154).

All laboratory tests and equipment used are certified and calibrated on annual bases.

All technicians performing laboratory test are certified and observed by senior technicians.

Ultraviolet Resistance Test Observation: The testing agent will record the percentage change in the ultimate tensile strength and elongation after 1,000 hours of weatherometer exposure.

Comments: The attached delineator/reflective sheeting used in conjunction with the delineator post are not under evaluation; however, the delineator post's capability to retain the attached delineator/sheeting will be documented.

Policy and expectations for manufacturers/suppliers observing their products' field evaluation impact testing:

- (a) Cooperate with the testing state and abide by their instructions;
- (b) Manufacturers/suppliers shall not impede the Lead State in their collection of test data;
- (c) Use of still cameras is acceptable;
- (d) Use of video camera is not allowed.

Products/Devices become the property of the Lead Testing State for purposes of examining physical properties at a later date.

Upon release of the NTPEP report related to the product/device, the manufacturer/supplier may submit a written request for release of product saved by the lead testing agency; the manufacturer must pay for any costs associated with shipping and handling.

AASHTO/NTPEP or Tennessee DOT assumes no responsibility for the condition of said device/product in removal, handling or shipping.

All test materials and/or products will be furnished by the manufacturer/supplier at no cost to the NTPEP.

Workzone Channelizers (Drums)

Application: Application for NTPEP testing of traffic control devices under this program requires completion of all forms contained in the Product Evaluation Form (PEF), “General Notes” and “Fee Calculation Sheet.” Upon receipt of application by the NTPEP Coordinator, the Manufacturer will be notified with assigned “TTCD” tracking number.

Sampling Upon receipt of the application the Lead State Contact will make arrangements with the Manufacturer to have the following quantities of traffic control devices randomly sampled at the point of manufacture and/or distribution. The Lead State will contact the sampling state (email) to arrange the sampling of the product(s). The sampling information shall have manufacturer location (with in sampling state), sampling protocol and the manufacturers contact information. A packet containing the labels is sent (mailed) to the manufacturer with a label noting not to open until the sampling state representative is present. The sampling state representative will then select at random from the manufacturers stock 10 posts (for each product(s) and place a label on each one with their signature. The sampling is then complete. The manufacturer will then send the samples to the testing state.

The above sampling protocol was set up to insure that products evaluated are randomly selected from manufacturers' inventory by the sampling state.

Workzone Channelizer (Drums) The plastic barrels (drums) shall meet all requirements as set forth in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) as pertaining to such device. Have 6" high performance reflective sheeting attached to the test samples. The Manufacturer shall Furnish at no cost to the testing state four plastic barrels and recommended ballast (if required) with the high performance reflective sheeting attached. Drums shall be randomly sampled by the testing agency or their appointed authority. Two barrels shall be striped as illustrated (figure 1) in configuration A and two barrels shall be striped as illustrated in configuration B. Furnish the chemical composition (high or low density polyethylene), physical characteristics, and unballasted weight of the plastic drums and base. The model number shall be permanently attached and/or molded on the barrel. The model number shall be capable of identifying the drum as high or low density.

Test Procedure Four plastic barrels with recommended ballast will be hit by a standard size sedan with a bumper height of approximately 18" while traveling at a speed of 55 + 2 mph. Each barrel is to be impacted ten times.

The barrels shall be exposed to ambient air temperature a minimum of thirty minutes prior to testing.

Five impacts to be conducted at an ambient air temperature of 32 + 5 °F.

- a. Two impacts to be direct (near center of vehicle).
- b. Three impacts to be direct wheel hits.

Five impacts to be conducted at an ambient air temperature of 85 + 5°F.

- a. Two impacts to be direct (near center of vehicle)
- b. Three impacts to be direct wheel hits

The barrels shall be reshaped after each impact and re-attached to bases (if applicable).

Replacement of the original test bases will not be allowed.

The vehicle used to perform test is a standard sedan from the testing states fleet the driver is trained and experience in the testing protocol.

Test Observations Prior to the testing, the agent inspecting each plastic barrel after each impact and documenting the following, the testing agent will determine and document if the plastic barrels are easily stackable and unstackable (shall not stick together) and capable of being ballasted (if required) as well as the following:

1. Any splits, breaks, cracks or other forms of deformation or distress,
2. Approximate percentage of sheeting damaged,
3. Type and weight of manufacturer's recommended ballast,
4. Whether or not barrels can be restocked after ten impacts,
5. Any problems or comments associated with reshaping or re-attaching two (2) piece barrel (if applicable),

Any other problems or comments associated with the performance of each barrel.

All above test observations are perform by trained and experienced technicians. The technicians inspecting each plastic barrel are checked by the recorder and overviewed by the Technical Chairman.

COMMENTS

The high performance reflective sheeting used in conjunction with the barrels is not under evaluation; however, the barrel's capability to retain the sheeting or damage to the sheeting will be documented.