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**Standard Practice for**

**NTPEP Evaluation of Temporary Traffic  
Control Devices: Flexible Delineators**

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**NTPEP Designation: [TTCD-18-01]**

**NTPEP**

**AASHTO**  
The American Association of State Highway and Transportation Officials

NATIONAL TRANSPORTATION  
PRODUCT EVALUATION PROGRAM

**American Association of State Highway and Transportation Officials  
444 North Capitol Street N.W., Suite 249  
Washington, D.C. 20001**

# NTPEP Evaluation of Temporary Traffic Control Devices



## Flexible Delineators

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### 1. SCOPE

- 1.1 This standard practice covers the requirements and testing criteria for the National Transportation Product Evaluation Program (NTPEP) evaluation of temporary traffic control devices under the category of Flexible Delineator Posts. NTPEP serves the member departments of the American Association of State Highway and Transportation Officials (AASHTO).
- 1.2 The results of this program may be used for product quality verification by individual member Departments. If used for quality verification, a letter of certification from the temporary traffic control devices (TTCD) manufacturer may be required by member Departments indicating testing was conducted by NTPEP that supports published values.
- 1.3 *This standard practice may involve hazardous materials, operations, and equipment. It does not purport to address all safety problems associated with its use. It is the responsibility of the user of this standard practice to establish the appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

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### 2. PRODUCT REQUIREMENTS

- 2.1 The manufacturer shall submit to the NTPEP Manager the electronic product evaluation form through DATAMINE. The form shall include product literature, technical literature including engineering drawings, MSDS information, and program payment for each product submitted for testing.
- 2.2 **Manufacturer's Documentation**
  - 2.2.1 **Submittal of Flexible Delineator Posts to NTPEP** - the manufacturer shall supply manufacturer documentation showing the brand name and designation; the composition or description and physical characteristics of the product; the type of retroreflective sheeting and the bonding agent or specific attachment methods used for surface mounted delineators.
  - 2.2.2 The manufacturer shall certify that as long as a device is furnished under the submitted brand name and designation, the device will be of the same composition and formulation as originally evaluated by the NTPEP. If any change in composition or formulation is made to a product under the submitted brand name and designation, the manufacturer will notify NTPEP and additional testing may be required.
  - 2.2.3 The manufacturer shall certify that the Flexible Delineator Posts meet all requirements as set forth in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) as pertaining to such device.

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### 3. SAMPLING

- 3.1 **Flexible Delineator Posts: Ground Mount & Surface Mount**

The lead state contact person will make arrangements to have the products sampled. TTCD product sampling shall be performed in accordance with the NTPEP temporary traffic control devices protocol. The manufacturer/supplier shall attach product/material literature and material data safety sheets to the Product Evaluation Form (PEF). All collected samples shall be labeled to show the manufacturer name, manufacturer's product code, type of material, and shall be shipped by and at the manufacturer's expense via a carrier with a freight tracking system. Samples shall be shipped to the NTPEP testing laboratory. Samples shall be labeled by the sampling agency with the testing center's reference number. The manufacturer will then be responsible for transportation of the samples to the appropriate testing facility.

- 3.1.1 Flexible delineator posts shall be randomly sampled by NTPEP appointed authority.
- 3.1.2 The manufacturer shall furnish, at no cost to the lead testing state, a minimum of ten (10) flexible delineator posts with the appropriate delineator or retro-reflectorized sheeting attached. (17 if testing for hot and cold weather)
- 3.1.3 Retroreflective sheeting shall be affixed to the post as recommended by the manufacturer. Retroreflectorized sheeting shall have comply with the minimum required retro-reflective sheeting as required by the MUTCD. The sheeting should be positioned within 2" ~~1/2" inch~~ from the top of delineator.

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## 4. FIELD EVALUATIONS

### 4.1 Generic Test Specifications

- 4.1.1 Impact vehicle will be modified MASH 1100C small sedan of a model made within the last 10 years.
  - 4.1.1.1 Allowable vehicle modifications shall fall within those described in TxDOT Research Report No. 0-6772-1 ( <https://tti.tamu.edu/documents/0-6772-1.pdf> ).
  - 4.1.1.2 Impact vehicle bumper, quarter panel, and bumper shell shall be replaced before beginning of each test. Other repairs should be made as needed.
- 4.1.2 The impact velocity and maximum number of impacts will vary based on the following categories:
  - Ground Mount Side of Roadway Applications (55 mph) – Maximum of 10 impacts.
    - Minimum height 48" – MUTCD Standard for Roadside Delineators
  - Metropolitan Delineator Applications (55 mph) – Maximum of 200 impacts.
  - High Speed Applications (70 mph) – Maximum of 200 impacts.
- 4.1.3 A Minimum of 8 samples will be impacted at each test temperature (hot/cold weather). The hot weather testing will take place at greater than 81 degrees F while the cold weather testing will take place at less than 34 degrees F.
- 4.1.4 The delineator shall be tested at height of 48-inches above ground for roadside delineator posts and 36-inches above pavement for surface-mounted channelizer posts. Manufacture has the option of testing at shorter heights in addition to the maximum height. Results of testing will only apply to product configurations of equal or lesser height than that which is tested.

### 4.2 Test Installation

- 4.2.1 Installation of delineators for testing shall be configured in 2 rows. One row will be aligned with the vehicle tires for the wheel over impact and the other row shall be aligned with the opposing vehicle quarter point for the bumper impact. Each delineator will be spaced a minimum of 2" greater than the delineator height from a subsequent delineator to prevent interaction of samples during testing.
- 4.2.2 Manufacturer has the option of defining the front face (0 deg) of the sample. If the manufacturer does not define the front face, then

the impact test facility will use reasonable judgement to determine the front face. Half of the Bumper and half of the Wheel Over impact samples will be installed with the front face perpendicular to the path of the impacting vehicle (0 deg). The remaining samples will be rotated 25 degrees. The testing lab will determine which direction of rotation (clockwise or counterclockwise) is more critical. Impact testing will be performed on the more critical direction of rotation. The impact test facility will evaluate the effect of bumper interaction with the post and base. The samples will be installed such that the more critical orientation is tested. The more critical orientation is one that potentially induces more interaction with the vehicle and presents the higher risk of sample failure during testing.

4.2.3 All samples shall be installed with a list/lean of less than 1.5 degrees from vertical.

**4.3 Surface Attachment**

4.3.1 All testing will be performed with the intended product and no substitutions will be allowed. Materials and technical specifications shall be submitted with each product

Surfaces used for impact testing will be as follows:

- Surface mount testing will be performed on a concrete surface.
- Ground mount testing will be performed in a standard soil that meets AASHTO standard specifications for “Materials

Aggregate and Soil Aggregate Subbase, Base, and Surface Courses,” designation M 147, grading A or B (see Appendix B, section B1). It should be compacted in accordance with Sections 304.05 of AASHTO’s *Construction Manual for Highway Construction* (see Appendix B, Section B3). The soil should be re-compacted, as necessary, before each test to meet density requirements of the Construction Manual. The soil should be well drained at the time of the crash test. The test should not be performed if the ground is frozen or if the soil is saturated unless the test is specifically designed to evaluate these conditions.

4.3.2 At least four delineators must be attached with each type of proposed attachment method with at least two of each method being a bumper impact and at least two of each method being a wheel over impact. An equal number of bumper and wheel over impacts will be performed on each method.

4.3.3 If more than two attachment methods are proposed, the number of samples tested at one time can be increased at the testing facility’s discretion with the addition 4 or more delineator samples to qualify each untested method. Should the number of attachment methods exceed the testing facility’s ability to test, then testing can be performed on a separate set of samples at a later time.

**4.4 Documentation**

4.4.1 Material and technical specifications shall be submitted with test samples and will be included in the report. Additionally, one (1) sample will be subjected to the following tests. Test results shall be included in the final test report.

Test Name	ASTM Number	Criteria
ASH Test	D5630	Documentation Only
Density and Specific Gravity	D792	Documentation Only
Yellowness Index	D1925 or E313	Documentation Only
Daylight Luminance	E1347	Documentation Only

4.4.2 Generic drawings shall be provided and included in final test report. The generic drawings of the product shall include the following minimum dimensions: overall height, post wall thickness, post diameter, attachment method, base diameter, and base height.

4.4.3 Detailed instructions for installation shall be submitted for each attachment method to be tested. Two additional randomly selected samples shall be submitted for potential destructive testing to verify the documentation information submitted is accurate.

4.4.4 All tests will be videotaped using a film frame rate of 30frames per second or greater. A counter showing impact number shall be in the field of view of the video camera during testing. The following lists the photos (at a minimum) that will be taken during testing:

- Photo of Counter showing impact number
- Photos of system: Longitudinal, Perpendicular, Oblique
- Delineator: Identifying label for test sample, frontal face of delineator, any damage to delineator, close up shot of reflective sheeting to document damage

- Impacting vehicle: Frontal and Oblique (wheel over side),

4.4.5 Photos will be taken at the following times:

- Prior to testing
- After first impact
- After 10th impact
- After 50th impact
- After 100th impact
- After 150th impact
- After 200th impact

4.4.6 Written documentation will list the following information at the specified times:

- Measurement of list and lean
  - Prior to testing
  - After 1<sup>st</sup> impact
  - After 10<sup>th</sup> impact
  - After 100<sup>th</sup> impact
  - After 200<sup>th</sup> impact
- List/Lean shall be measured as shown in Figure 1 below

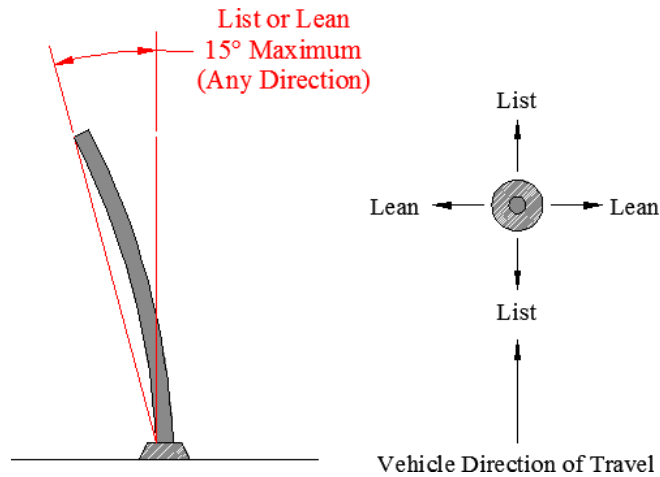


Figure 1. Measurement of List/Lean

- Document any damage to delineator

- Document any failures and on what impact they occurred
- Failure of delineator to self-restore to within 15° of vertical in any direction
  - Measurement will be taken within 5 minutes last impact
  - Testing will be postponed until either all samples are deemed within 15° of vertical or the suspect sample is deemed failed

#### 4.5 Testing

4.5.1 All impacts shall be made in the same direction of travel and only fresh untested samples will be used. Bases may be reused at the discretion of manufacturer and testing lab. All 200 impacts will be performed on the same samples. Only one manufacture product may be tested at a time.

#### 4.6 Evaluation of Testing

4.6.1 If a representative attachment method fails prematurely, the attachment method can be reevaluated only once. A full installation of eight samples of the failed method must be tested. This method will be qualified separately from all other attachment methods. Samples are considered to have failed if they do not self-restore to within 15° from vertical within 5 minutes of being impacted.

#### 4.7 Reported Values

- 4.7.1 The following values will be reported on the specified timeline:
- Number of impacts resisted by each sample
  - Average number of impacts resisted for each surface attachment method
    - Average number of tire impacts resisted
    - Average number of bumper impacts resisted
    - Average number of overall impacts resisted
  - Average number of impacts resisted for all samples
    - Average number of tire impacts resisted
    - Average number of bumper impacts resisted
    - Average number of overall impacts resisted
  - Table of images for each delineator

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### 5. EVALUATION FACILITY REQUIREMENTS

5.1 Testing shall be performed by a laboratory listed on FHWA’s list of “Laboratories Accredited to Crash Test Roadside Safety Hardware.” A full list of approved labs can be found on FHWA’s website at: <http://www.tf13.org/pdf/Crash%20Testing%20Facilities.docx>

5.1.1 The scope can be obtained by viewing the AAP directories of accredited laboratories at [www.nist.gov/amrl](http://www.nist.gov/amrl) or by contacting AMRL.

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### 6. REPORT

The report shall include manufacturer’s name, location, product information and description. The report will also include the initial and final data collected for the Field evaluations for the **Delineator Posts**.

6.1 Test results will be reported to the NTPEP Manager in the web-based data base – DataMine as follows. Once the data is reported to the manager, the NTPEP Manager will forward each manufacturer’s data to them for their review. When the manufacturer reviews and accepts the data, the NTPEP manager will release the data to the public.

6.2 Evaluation data will be compiled and made available to all participating states and testing companies through the AASHTO/NTPEP DataMine. This report will include data only. No judgment as to a product’s acceptability will be made in this report. End user participants will establish individual criteria for product acceptability.

6.3 *DataMine* – This web-based data base can be accessed through the AASHTO-NTPEP web site link at [www.data.ntpep.org](http://www.data.ntpep.org).

## 7. EVALUATION FREQUENCY

7.1 If the TTCD does not perform adequately during the initial testing, the manufacturer may, at his option, withdraw the product from the current evaluation process. The report will show only the data of the evaluation process completed before withdrawal. The manufacturer may submit the device for retesting during the next, or any subsequent, testing cycle. Product testing results is only valid for ten (10) years. After ten (10) years the product shall be resubmitted for reevaluation.

## 8. TIMELINE

8.1 The Intent of the timeline is to give the manufacturer and or supplier a reasonably time frame for the completion of the evaluation process. See table 1

**Table 1**---Timeline of submittal to completion of the evaluation process

				Time Line (months)														
		Duration (Months)		-	-	1	2	3	4	5	6	7	8	9	10	11	12	13
		Details		2	1													
April	Submission Administration	Testing Cycle is Posted	0															
May		Submissions are due	0	2														
		Assignment letters	1.5	1														
June	Product Sampling	Coordination Sampling	1		1													
July	Product Application	Installation	1			1												
August	Product Testing	Testing Cycle 1	1				1	2	3									
Dec / Feb		Testing Cycle 2	6							1	2	3	4	5				
March	Product Reporting	Results	0															
		Final Results	1													1	2	
March / April	Manu Review	Final Results	1															1
May	Report/Data	Final Results	1															1



## 9. KEYWORDS

9.1 NTPEP; Flexible Delineator Posts (**Ground Mount**) Delineator Posts (**Surface Mount**); DataMine.



AASHTO Designation: [Number]  
NTPEP Evaluation of Temporary Traffic Control Devices

## APPENDIXES

### APPENDIX A

#### Temporary Traffic Control Sampling Protocol

The **NTPEP Manager** will send to the **testing state** (Florida) the PEFs for all products in the testing cycle.

The **testing state** will contact by phone and email the **sampling state(s)** with instructions and location information on where to sample within their state (manufacturer information, location and the product(s) name). **Attached Form 1.0 and Form 1.1**

The testing state will supply labels (**Attached Form 1.2**) to be placed on the products as they are sampled. The labels are sent to the manufacturers or suppliers' marked with a label on the outside stating **DO NOT OPEN** until sampling state representative is present (**shown below**).



The **sampling state representative** sets a scheduled date and time to sample the product(s).

The **sampling state representative** will randomly select samples from a randomly selected lot of a manufactures or suppliers' inventory.

The **sampling state representative** will initial and place the labels on the selected samples.



The Manufacturer or supplier will then ship the sampled products to the testing state.

APPENDIX A: Form 1

**FORM 1.0**  
**THIS FORM IS SENT TO THE STATE**  
**MATERIALS OFFICE OR THE NTPEP**  
**CONTACT FOR THE SAMPLING**  
**STATE**



STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
605 SUWANNEE STREET MS-75  
TALLAHASSEE, FLORIDA 32399-1650  
PRODUCT EVALUATION, PROGRAM MANAGEMENT

June 7, 2018

State Materials Engineer  
Washington State DOT  
P O Box 47365  
Olympia, WA 98504-7365

**RE: AASHTO NTPEP Oversight Committees request for sampling of Roadside Delineators for NTPEP evaluation**

Dear Mr. State Materials Engineer

This letter is to ask for your assistance in the matter of the sampling of Roadside Delineators for NTPEP evaluation.

Attached along with this letter is a sheet containing the request and contact information for the manufacturer located within your state.

In addition, a packet containing labels to be placed on the samples of the products to be evaluated is sent to the manufacturer within your state. Along with the instructions not to open until a representative from your Department is present. The representative from your Department then shall randomly select samples from a randomly selected lot. The labels are then placed on each sample selected and initialed by the representative from your Department. After the labels are placed, the manufacturer sends the samples to the lead state (Florida Department of Transportation) for evaluation.

Your assistance in this matter will be greatly appreciated. If you have any questions please call 850.414.4118.

Sincerely,

Paul Gentry  
Product Evaluation Coordinator  
Product Evaluation  
Program Management

**FORM 2\***  
**THIS FORM IS SENT TO THE STATE MATERIALS OFFICE OR THE NTPEP CONTACT FOR THAT STATE**

\*This Form is also included in the packet along with the labels sent to the Manufacturer and/or Supplier.

## AASHTO NTPEP OVERSIGHT COMMITTEE

### REQUEST FOR SAMPLING OF DRUMS AND DELINEATORS FOR NTPEP EVALUATION

LEAD STATE: **TENNESSEE**

SAMPLING STATE: **WASHINGTON**

MANUFACTURER: **ACME Delineators**

CONTACT: **MR. JOHN HIGHWAY**

PHONE: 555 .284. 9000 FAX: 555 .284. 8000

#### SAMPLING OF DELINEATORS

#### TTCD (20 10 W – S) - 3 ACME Ground Mount Delineator

The sampling state will take 10 random samples (at state discretion) of each product. Place a label (Lead State provided) on each drum or delineator, and then the manufacturer will ship the samples to the Lead State.

A sample of the label is shown below, Note that if label is lost or destroyed sampling state inspector may initial or place another label at their discretion.

**Thanks for your cooperation in this matter; if you have any questions please call Danny Lane at 615.350.4175.**

<b>AASHTO NTPEP OVERSIGHT COMMITTEE          REQUEST FOR SAMPLING OF DRUMS AND          DELINEATORS FOR NTPEP EVALUATION</b>	
State of Washington	
<b>TTCD 20 10 (W – S) - 3</b>	
LOT NO: _____	SAMPLE NO: <u>  1  </u>
INSPECTOR : _____	DATE: _____