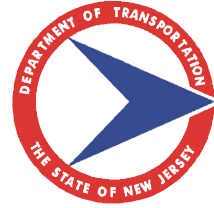


**New Jersey Department of Transportation**

1035 Parkway Avenue, PO Box 600, Trenton, New Jersey 08625-0600

**Baseline Document Change Announcement**



**Retroreflective Sheeting Types**

**BDC02S-23**

**February 03, 2004**

**SUBJECT:** Revision to Subsections 619.03, 619.04, 620.03, 620.04, 620.05, 916.04, 916.05, 916.08, 916.14 and 916.17 of the *2001 Standard Specifications for Road and Bridge Construction in English and Metric units*

**REFERENCE:** Revision to Construction Detail sheets CD-617-1, 2, 6, &7 via BDC02D-08 dated Feb 02, 2004

The 2001 Standard Specifications Subsections as noted above have been revised to incorporate ASTM D 4956 as the primary standard for specifying and approving retroreflective sheetings. The following is a list of current sheeting types and corresponding new ASTM D 4956 sheeting types:

Current NJDOT Retroreflective sheeting types	Replaced by Corresponding ASTM D 4956 sheeting type
II & III	III
IIIA	III
IIIB (Reboundable)	III (With supplemental ASTM S2 specification)
IVA (eliminate 50/60° Requirement)	VII or VIII
IVB (fluorescent orange)	VII or VIII
V	VI
VI	VIII or IX

The following revisions have been incorporated in both the English unit Standard Input SI2001E1 and Metric unit Standard Input SI2001M1 dated February 03, 2004.

The following revisions are incorporated in the English unit Standard Input SI2001E1:

## **SECTION 619 - SIGNS**

### **CONSTRUCTION**

#### **619.03 Regulatory and Warning Signs.**

THE FIRST PARAGRAPH IS CHANGED TO:

Regulatory and warning signs shall be fabricated of flat aluminum sheets and shall be covered with ASTM D 4956 Type III retroreflective sheeting. Legends, borders, and accessories shall be Type B unless otherwise designated. Signs shall be fabricated according to Subsection 916.08.

#### **619.04 Guide Signs.**

THE FIRST PARAGRAPH IS CHANGED TO:

Guide signs fabricated of extruded aluminum sheets shall be covered with ASTM D 4956, TYPE III, Type VIII or Type IX retroreflective sheeting depending on the following:

1. Guide signs on steel "U" posts shall be fabricated of flat aluminum sheets and shall be covered with ASTM D 4956 Type III retroreflective sheeting. Legends, borders, and accessories shall be Type B unless otherwise designated.
2. Guide signs on overheads and breakaway or non-breakaway posts shall be fabricated of extruded aluminum panels covered with ASTM D 4956 Types VIII or IX retroreflective sheeting. Legends, borders, and accessories shall be Type A.

## **SECTION 620 - DELINEATORS**

### **CONSTRUCTION**

#### **620.03 Ground Mounted Flexible Delineators.**

THE SECOND PARAGRAPH IS CHANGED TO:

Retroreflective sheeting, ASTM D 4956 Types VII or VIII shall be pre-applied to the front (surface facing traffic) of the unit by the manufacturer. The retroreflective sheeting shall cover a minimum area of 3 by 12 inches, beginning a maximum of 2 inches from the top of the post. The color shall be white when the delineator is located on the right side to the direction of traffic and shall be yellow when the delineator is located on the left side to the direction of traffic.

#### **620.04 Guide Rail Mounted Flexible Delineators.**

THE SECOND PARAGRAPH IS CHANGED TO:

Retroreflective sheeting, ASTM D 4956 Types VII or VIII shall be applied to the upper portion of the flexible delineator panel. The retroreflective sheeting shall cover a minimum area of 4 ½ by 4 ½ inches (4 ½ by 9 inches for deceleration and acceleration lanes). The color shall be white when the delineator is located on the right side to the direction of traffic and shall be yellow when the delineator is located on the left side to the direction of traffic.

#### **620.05 Barrier Curb Mounted Flexible Delineators.**

THE THIRD PARAGRAPH IS CHANGED TO:

Retroreflective sheeting, ASTM D 4956 Types VII or VIII shall be applied to the upper portion of the flexible delineator panel facing traffic and perpendicular to the top of the concrete barrier curb. The retroreflective sheeting

shall cover an area of 3 1/2 by 3 1/2 inches. The color shall be white when the delineator is located on the right side to the direction of traffic and shall be yellow when the delineator is located on the left side to the direction of traffic.

### SECTION 916 - SIGN MATERIALS

#### 916.04 Retroreflective Sheeting.

THE ENTIRE TEXT IS CHANGED TO:

As stated herein, the terms reflective sheeting and retroreflective sheeting are synonymous.

Retroreflective sheeting shall conform to ASTM D 4956 based upon results obtained and reported through testing performed by the National Transportation Product Evaluation Program (NTPEP).

Flourescent retroreflective sheeting shall be selected from the approved products list as provided in the Special Provisions.

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**APPROVED LIST OF FLOURESCENT RETROREFLECTIVE SHEETING SUPPLIERS IS AS FOLLOWS:**

1. 3M CO. LDP-3963 FLOURESCENT YELLOW-GREEN (FOR SCHOOL ADVANCED-WARNING AND NON-MOTORIZED CROSSINGS ONLY)
  2. 3M CO. VIP-3983 FLOURESCENT YELLOW-GREEN (FOR SCHOOL ADVANCED-WARNING AND NON-MOTORIZED CROSSINGS ONLY)
  3. 3M CO. VIP-3981 FLOURESCENT YELLOW (FOR W-8 CHEVRON WARNING SIGNS ONLY)
  4. 3M CO. SCOTCHLITE DIAMOND GRADE SERIES 3910 FLOURESCENT ORANGE (FOR USE ON REBOUNDABLE PLASTIC TRAFFIC CONTROL DEVICES ONLY)
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#### 1. General Requirements.

- a. **Retroreflectance.** All retroreflective sheeting shall have the minimum coefficient of retroreflection (R<sub>A</sub>) in conformance with ASTM D 4956.
- b. **Color.** The colors of the retroreflective sheeting, except for flourescent colors shall conform the color requirements of ASTM D 4956.
- c. **Flourescent Colors.** The daytime flourescent color of retroreflective sheeting shall be determined according to ASTM E 991.

In addition, the color shall be equally distinguishable in daylight and at night under artificial headlight illumination. The color shall have a consistent chromaticity across all signs of the same color. Noticeable deviation from the shades that would affect the required performance shall be a cause for rejection of any sheeting or completed sign at any time before acceptance. For sheeting that is directional, the datum mark (arrow) imprinted on the face of the sheeting shall be the datum mark for test purposes.

- d. **Product Performance Requirements.** The retroreflective sheeting manufacturer shall meet the following requirements for their products.
  - (1) Type III Sheeting – Sheeting shall be required to have a service life span of at least 12 years.
  - (2) Types VI, VII, VIII AND IX Sheeting – Sheeting shall be required to have a service life span of at least 10 years.
  - (3) The performance requirements shall be such that there is: no loss of retroreflectivity; no loss of colorfastness; no cracking; and no other conditions inherent to the sheeting including inks and overlay film that causes it to be incapable of performing as required.

#### 2. Certification of Compliance.

The manufacturer shall submit a certification of compliance according to Subsection 106.04 for each lot of sheeting supplied for use on the Project.

**916.05 Legends, Borders, and Accessories.**

THE FOLLOWING IS ADDED AFTER THE SECOND PARAGRAPH:

All finished signs shall be clear and legible without smudging, blisters, delamination, loose edges or other blemishes.

**1. Type A Demountable.**

THE FIRST AND SECOND PARAGRAPHS ARE CHANGED TO:

The demountable sign letters, digits, arrows, borders, and alphabet accessories shall be reflectorized and shall consist of ASTM D 4956 Type VIII OR IX wide angle prismatic retroreflective sheeting applied to 3/8-inch cutout aluminum plates conforming to ASTM B 209, Alloy 6061-T6 or 5052.

All shields and symbols to be mounted to sign types GO, GOX, and GA on breakaway tubular posts shall consist of ASTM D 4956 Type VIII OR IX wide angle prismatic retroreflective sheeting applied to 3/16-inch cutout aluminum plates conforming to ASTM B 209, Alloy 6061-T6.

**2. Type B Direct and Permanently Applied Retroreflective Sheeting Copy.**

SUBPART D, E & F ARE DELETED AND C IS CHANGED TO:

- c. When the background is ASTM D 4956 Type III sheeting, ASTM D 4956 Type III sheeting shall be used for copy.

**916.08 Fabrication.****8. Shop Painting and Reflectorization.****a. Application.**

THE LAST SENTENCE IN THE THIRD PARAGRAPH IS CHANGED TO:

Sheeting applied to extruded sections shall extend over top edges and down side legs a minimum of 1/16 inch; except that where ASTM D 4956 Type VIII or IX sheeting is used, it shall be cut at the top edges according to the manufacturer's recommendation.

**c. Screen Process Printing.**

THE THIRD SENTENCE IN THE FIRST PARAGRAPH IS CHANGED TO:

Transparent screen process paint, after application to the retroreflective sheeting and thoroughly dry shall conform to the color requirements ASTM D 4956.

**9. Packaging, Storage, and Shipping.**

THE FIRST SENTENCE IN THE FIRST PARAGRAPH IS CHANGED TO:

Packaging, storage, and shipping of signs produced using retroreflective sheeting shall be according to the sheeting manufacturer's recommendations.

**916.14 Flexible Delineators.****2. Composition.**

THE FIRST PARAGRAPH IS CHANGED TO:

For ground mounted flexible delineators, the portion of the unit above ground shall be one component, or shall be bonded together if it consists of two or more components. The shape of the ground mounted post shall have a concave, fluted or similarly shaped cross section conducive to the protection of the retroreflective sheeting from abrasion. Delineator post cross sections that are predominantly convex, which will allow the retroreflective sheeting to come in direct contact with the impacting vehicle or impacting surface shall not be allowed.

**10. Mowability.**

THE ENTIRE SUBPART IS DELETED

**11. Sampling Rate**

THE SUBPART NUMBER IS CHANGED TO

**10. Sampling Rate.**

**916.17 Tables.**

THE ENTIRE SUBSECTION IS DELETED.

The following revisions are incorporated in the Metric unit Standard Input SI2001M1:

**SECTION 619 - SIGNS**

**CONSTRUCTION**

**619.03 Regulatory and Warning Signs.**

THE FIRST PARAGRAPH IS CHANGED TO:

Regulatory and warning signs shall be fabricated of flat aluminum sheets and shall be covered with ASTM D 4956 Type III retroreflective sheeting. Legends, borders, and accessories shall be Type B unless otherwise designated. Signs shall be fabricated according to Subsection 916.08.

**619.04 Guide Signs.**

THE FIRST PARAGRAPH IS CHANGED TO:

Guide signs fabricated of extruded aluminum sheets shall be covered with ASTM D 4956, TYPE III, Type VIII or Type IX retroreflective sheeting depending on the following:

1. Guide signs on steel "U" posts shall be fabricated of flat aluminum sheets and shall be covered with ASTM D 4956 Type III retroreflective sheeting. Legends, borders, and accessories shall be Type B unless otherwise designated.
2. Guide signs on overheads and breakaway or non-breakaway posts shall be fabricated of extruded aluminum panels covered with ASTM D 4956 Types VIII or IX retroreflective sheeting. Legends, borders, and accessories shall be Type A.

**SECTION 620 - DELINEATORS**

**CONSTRUCTION**

**620.03 Ground Mounted Flexible Delineators.**

THE SECOND PARAGRAPH IS CHANGED TO:

Retroreflective sheeting, ASTM D 4956 Types VII or VIII shall be pre-applied to the front (surface facing traffic) of the unit by the manufacturer. The retroreflective sheeting shall cover a minimum area of 75 by 300 millimeters, beginning a maximum of 50 millimeters from the top of the post. The color shall be white when the delineator is located on the right side to the direction of traffic and shall be yellow when the delineator is located on the left side to the direction of traffic.

**620.04 Guide Rail Mounted Flexible Delineators.**

THE SECOND PARAGRAPH IS CHANGED TO:

Retroreflective sheeting, ASTM D 4956 Types VII or VIII shall be applied to the upper portion of the flexible delineator panel. The retroreflective sheeting shall cover a minimum area of 115 by 115 millimeters (115 by 230 millimeters for deceleration and acceleration lanes). The color shall be white when the delineator is located on the right side to the direction of traffic and shall be yellow when the delineator is located on the left side to the direction of traffic.

**620.05 Barrier Curb Mounted Flexible Delineators.**

THE THIRD PARAGRAPH IS CHANGED TO:

Retroreflective sheeting, ASTM D 4956 Types VII or VIII shall be applied to the upper portion of the flexible delineator panel facing traffic and perpendicular to the top of the concrete barrier curb. The retroreflective sheeting shall cover an area of 90 by 90 millimeters. The color shall be white when the delineator is located on the right side to the direction of traffic and shall be yellow when the delineator is located on the left side to the direction of traffic.

**SECTION 916 - SIGN MATERIALS**

**916.04 Retroreflective Sheeting.**

THE ENTIRE TEXT IS CHANGED TO:

As stated herein, the terms reflective sheeting and retroreflective sheeting are synonymous.

Retroreflective sheeting shall conform to ASTM D 4956 based upon results obtained and reported through testing performed by the National Transportation Product Evaluation Program (NTPEP).

Flourescent retroreflective sheeting shall be selected from the approved products list as provided in the Special Provisions.

\*\*\*\*\*  
**APPROVED LIST OF FLOURESCENT RETROREFLECTIVE SHEETING SUPPLIERS IS AS FOLLOWS:**

- 1. 3M CO. LDP-3963 FLOURESCENT YELLOW-GREEN (FOR SCHOOL ADVANCED-WARNING AND NON-MOTORIZED CROSSINGS ONLY)
- 2. 3M CO. VIP-3983 FLOURESCENT YELLOW-GREEN (FOR SCHOOL ADVANCED-WARNING AND NON-MOTORIZED CROSSINGS ONLY)
- 3. 3M CO. VIP-3981 FLOURESCENT YELLOW (FOR W-8 CHEVRON WARNING SIGNS ONLY)
- 4. 3M CO. SCOTCHLITE DIAMOND GRADE SERIES 3910 FLOURESCENT ORANGE (FOR USE ON REBOUNDABLE PLASTIC TRAFFIC CONTROL DEVICES ONLY)

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**1. General Requirements.**

- a. **Retroreflectance.** All retroreflective sheeting shall have the minimum coefficient of retroreflection ( $R_A$ ) in conformance with ASTM D 4956.
- b. **Color.** The colors of the retroreflective sheeting, except for fluorescent colors shall conform the color requirements of ASTM D 4956.
- c. **Flourescent Colors.** The daytime fluorescent color of retroreflective sheeting shall be determined according to ASTM E 991.

In addition, the color shall be equally distinguishable in daylight and at night under artificial headlight illumination. The color shall have a consistent chromaticity across all signs of the same color. Noticeable deviation from the shades that would affect the required performance shall be a cause for rejection of any sheeting or completed sign at any time before

acceptance. For sheeting that is directional, the datum mark (arrow) imprinted on the face of the sheeting shall be the datum mark for test purposes.

**d. Product Performance Requirements.** The retroreflective sheeting manufacturer shall meet the following requirements for their products.

- (1) Type III Sheeting – Sheeting shall be required to have a service life span of at least 12 years.
- (2) Types VI, VII, VIII AND IX Sheeting – Sheeting shall be required to have a service life span of at least 10 years.
- (3) The performance requirements shall be such that there is: no loss of retroreflectivity; no loss of colorfastness; no cracking; and no other conditions inherent to the sheeting including inks and overlay film that causes it to be incapable of performing as required.

**2. Certification of Compliance.** The manufacturer shall submit a certification of compliance according to Subsection 106.04 for each lot of sheeting supplied for use on the Project.

**916.05 Legends, Borders, and Accessories.**

THE FOLLOWING IS ADDED AFTER THE SECOND PARAGRAPH:

All finished signs shall be clear and legible without smudging, blisters, delamination, loose edges or other blemishes.

**1. Type A Demountable.**

THE FIRST AND SECOND PARAGRAPHS ARE CHANGED TO:

The demountable sign letters, digits, arrows, borders, and alphabet accessories shall be reflectorized and shall consist of ASTM D 4956 Type VIII OR IX wide angle prismatic retroreflective sheeting applied to 10-millimeter cutout aluminum plates conforming to ASTM B 209, Alloy 6061-T6 or 5052.

All shields and symbols to be mounted to sign types GO, GOX, and GA on breakaway tubular posts shall consist of ASTM D 4956 Type VIII OR IX wide angle prismatic retroreflective sheeting applied to 5-millimeter cutout aluminum plates conforming to ASTM B 209, Alloy 6061-T6.

**2. Type B Direct and Permanently Applied Retroreflective Sheeting Copy.**

SUBPART D, E & F ARE DELETED AND C IS CHANGED TO:

- c. When the background is ASTM D 4956 Type III sheeting, ASTM D 4956 Type III sheeting shall be used for copy.

**916.08 Fabrication.**

**8. Shop Painting and Reflectorization.**

**a. Application.**

THE LAST SENTENCE IN THE THIRD PARAGRAPH IS CHANGED TO:

Sheeting applied to extruded sections shall extend over top edges and down side legs a minimum of 2 millimeters; except that where ASTM D 4956 Type VIII or IX sheeting is used, it shall be cut at the top edges according to the manufacturer's recommendation.

**c. Screen Process Printing.**

THE THIRD SENTENCE IN THE FIRST PARAGRAPH IS CHANGED TO:

Transparent screen process paint, after application to the retroreflective sheeting and thoroughly dry shall conform to the color requirements ASTM D 4956.

**9. Packaging, Storage, and Shipping.**

THE FIRST SENTENCE IN THE FIRST PARAGRAPH IS CHANGED TO:

Packaging, storage, and shipping of signs produced using retroreflective sheeting shall be according to the sheeting manufacturer's recommendations.

**916.14 Flexible Delineators.**

**2. Composition.**

THE FIRST PARAGRAPH IS CHANGED TO:

For ground mounted flexible delineators, the portion of the unit above ground shall be one component, or shall be bonded together if it consists of two or more components. The shape of the ground mounted post shall have a concave, fluted or similarly shaped cross section conducive to the protection of the retroreflective sheeting from abrasion. Delineator post cross sections that are predominantly convex, which will allow the retroreflective sheeting to come in direct contact with the impacting vehicle or impacting surface shall not be allowed.

**10. Mowability.**

THE ENTIRE SUBPART IS DELETED

**11. Sampling Rate**

THE SUBPART NUMBER IS CHANGED TO

**10. Sampling Rate.**

**916.17 Tables.**

THE ENTIRE SUBSECTION IS DELETED.

This announcement must be used in conjunction with the corresponding changes made to Roadway Construction Details via BDC02D08 dated February 02, 2004.

**Distribution and Announcement Access Information:**

This announcement is being distributed electronically to our in-house staff and various public agencies based on our distribution list.

Internet access to this BDC Announcement can be downloaded and viewed from the following New Jersey Department of Transportation Web Page:

<http://www.state.nj.us/transportation/cpm/BaselineDocuments>

These revisions have been incorporated in the Standard Inputs *SI2001E1* and *SI2001M1* dated February 03, 2004 from the following New Jersey Department of Transportation Web Page:

<http://www.state.nj.us/transportation/cpm/StandardInputs/standardinputs.htm>

Hard copies are available on a limited basis by contacting EDU at the following address:

Engineering Documents Unit  
E&O Building, 1<sup>st</sup> Floor  
1035 Parkway Avenue, PO Box 600  
Trenton, New Jersey 08625-0600  
Phone: (609) 530-5587  
Fax: (609) 530-6626



**Implementation Code R (ROUTINE)**

Changes must be implemented in all applicable Department projects scheduled for Final Design Submission at least one month after the date of the BDC announcement. This will allow designers to make necessary plan, specifications, and estimate/proposal changes without requiring the need for an addenda or postponement of advertisement or receipt of bids.

**Recommended By:**

**Approved By:**

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Brian Strizki  
Director,  
Quality Management Services

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F. Howard Zahn  
Assistant Commissioner,  
Capital Program Management

BJS:KS:HVP  
BDC02S-23.doc

Superseded