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| REVIEW OF NEW SPECIFICATION OR SPECIFICATION CHANGE  | **Log No.**  106-14 2nd Review |
| **Specification Section No.:** 106, 627, and 713` | **Item:** Glass Beads for Pavement Marking |
| **Originating Office:** Traffic | **By:** Chevalier/Matthews |
| **Date Sent For Review:** January 19, 2011 | **Date Comments Due: January 26, 2011** |
| Please submit response to: STANDARDS AND SPECIFICATIONS UNIT, ROOM 290, HEADQUARTERS, DENVER |
| **Reviewer** | **Concurrent Reviews – Others Commenting** | The attached Draft Specification is submitted for your review and comments. If not returned by Date Comments Due, the draft specification will be considered to be approved unless the Specification Unit of Staff Design [(303) 757-9474, (303) 757-9402] is advised otherwise.**REMARKS:** This is the second review of this proposed new standard special provision. Modifications have been made to the original to propose the use of a bead applicator that provides a 360 degree dispersion pattern with a 360 degree shroud. In addition, the applicator cannot move faster than 8 miles per hour.If these proposed changes are approved, our unit will issue these as a new standard special provision. The existing standard special provision, Revision of Section 713, Glass Beads for Traffic Marking will be deleted. |
|  | **Spec Committee Members:** |  |
|  | Chairman: Wassenaar | X |
|  | Region 1: Cox | **X** |
|  | Region 2: Burch | **X** |
|  | Region 3: Alexander | **X** |
|  | Region 4: Frieler | **X** |
|  | Region 5: Beller | **X** |
|  | Region 6: Koenig | **X** |
|  | Project Development: Lacey | **X** |
|  | Specifications: Brinck | **X** |
|  | Bridge: Hasan | **X** |
|  | Agreements:  | **X** |
|  | Materials: Zufall | **X** |
|  | Traffic Engineering: Matthews | **X** | REVIEWER COMMENTS:( ) Approved ( ) Disapproved ( ) ModifiedIf disapproved or modified, give reason why and show any modifications on the attached draft copy: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ Name/Signature Date |
|  | Maintenance: Mueller | **X** |
|  | FHWA: Urban | **X** |
|  | Attorney General: Spear | **X** |
|  | Attorney General: Morrow | **X** |
|  |  |  |
|  | **Others:** |  |
|  | Colorado Contractors Assoc.: Moody | **X** |
|  |  |  |
|  | **Technical Committees:** |  |
|  | Bridge |  |
|  | Culvert |  |
|  | Joint Co-op, CCA/CDOT |  |

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| **COLORADO DEPARTMENT OF TRANSPORTATION****SUBMITTAL OF NEW SPECIFICATION OR SPECIFICATION CHANGE** | Log No. (Assigned by Standards and Specifications Unit)106-14 2nd review |
| TO: Standards and Specifications Unit, Project Development, Suite 290 | FROM:HQ Traffic Engineering Branch(Region, Branch or Technical Committee) |
| SPECIFICATION SECTION NO.106,627,713 | ITEMGlass Bead in Pavement Markings | Priority Routine[x]  Fast[ ]  |
| Reason for this new or changed specification:To update the quanity, gradation, and properties of glass beads used on state ROW |
| New or Revised Specification:See Attached. |
| Note: See Procedural Directive 513.1 for a description of appropriate specification development procedures. |

 **CDOT Form 1215 10/01**

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REVISION OF SECTIONS 106, 627 AND 713
GLASS BEADS FOR PAVEMENT MARKING

Sections 106, 627, and 713 are hereby revised for this project as follows:

Subsection 106.11 shall include the following:

All post consumer and industrial glass beads for pavement marking shall have been manufactured from North American glass waste streams in the United States of America. The bead manufacturer shall submit a COC in accordance with subsection 106.12 confirming that North American glass waste streams were used in the manufacture of the glass beads.

Subsection 627.03 shall include the following:

*(f) Applicator Rate.*  Bead application vehicle shall be operated at a maximum speed of 8 miles per hour.

Subsection 627.04 shall include the following:

Glass beads shall be applied into the paint by means of a low pressure, gravity drop bead applicator. The bead applicator shall disperse the glass beads using a 360 degree dispersion pattern and a 360 degree shroud for the specified width of longitudinal pavement marking.

In subsection 627.05, seventh paragraph, delete the second sentence and replace with the following:

Glass beads shall be applied into the epoxy pavement marking by means of a low pressure, gravity drop bead applicator. The bead applicator shall disperse the glass beads using a 360 degree dispersion pattern and a 360 degree shroud for the specified width of longitudinal pavement marking.

In subsection 627.05, delete the last paragraph and replace with the following:

Epoxy pavement marking and beads shall be applied within the following limits:

**Application Rate or Coverage
Per Gallon of Epoxy Pavement Marking**

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|  | **Minimum** | **Maximum** |
| 16 mil marking | 100 sq. ft. | 110 sq. ft. |
| Beads | 18 lbs. | 20 lbs. |

Subsection 627.06 (c) shall include the following:

Glass beads shall be applied into the thermoplastic pavement marking by means of a low pressure, gravity drop bead applicator. The bead applicator shall disperse the glass beads using a 360 degree dispersion pattern and a 360 degree shroud for the specified width of longitudinal pavement marking.

In subsection 713.08, delete the first and third paragraphs and replace with the following:

**713.08 Glass Beads for Pavement Marking.** Glass beads for pavement marking shall conform to AASHTO M 247, except for the following:

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REVISION OF SECTIONS 106, 627 AND 713
GLASS BEADS FOR PAVEMENT MARKING

1. Gradation:

**U.S. Mesh Microns % Retained**

16 1400 0 - 10

18 1000 20 - 35

30 600 50 - 70

50 300 95 - 100

1. Roundness: All beads must meet a minimum of 80 percent true spheres by the Office of Federal Lands Highways FLH T520.
2. Color / Clarity: Beads shall be colorless, clear, and free of carbon residues.
3. Refractive Index: Minimum 1.51 by oil immersion method.
4. Air Inclusions: Less than 5 percent by visual count.
5. Coatings: Per manufacturer’s recommendation for optimum adhesion and embedment.
6. Chemical Resistance: Beads shall be resistant to hydrochloric acid, water, calcium chloride, and sodium sulfide as tested per methods outlined in sections 4.3.6 to 4.3.9 of the TT-B Federal Spec.1325D.
7. A minimum of 40 percent of the total weight shall be manufactured using a molten kiln direct melt method. All molten kiln direct melt glass beads shall be above the 600 µm (#30) sieve.
8. Glass beads used for any type of pavement marking shall not contain more than 75 parts per million (ppm) Arsenic, 75 ppm Antimony and 100 ppm Lead.