

## DMS-8290, Glass Traffic Beads

### Overview

Effective Date: March 2001 – April 2003.

This specification shall govern for the materials, composition, quality, sampling, and testing of glass traffic beads.

### Bidders' and/or Suppliers' Requirements

All prospective bidders and/or suppliers are notified that, before any material is considered, it shall be of manufacture and product code or designation shown on the list of approved manufacturers of materials covered by this specification and maintained by CST/M&P of TxDOT.

### Sampling and Testing

Sampling shall be in accordance with Test Method "Tex-830-B, Sampling Traffic Beads."

Testing shall be in accordance with the methods listed in 'Material Requirements' of this specification.

### Packaging and Labeling

#### *Packaging*

Beads purchased by state requisition shall be packaged in 22.7 kilograms (50 pound) bags constructed as follows:

- ◆ The bags shall be a minimum of five (5) plies, consisting of two (2) plies of 22.7 kilograms (50 pounds) weight (minimum) natural Kraft paper, one (1) ply of 0.02 millimeter (0.8 mil) high density polyethylene, and two (2) plies of 22.7 kilograms (50 pounds) weight (minimum) natural Kraft paper.
- ◆ Seams in the bag walls shall have strength equal to the paper. The bottom and top seam shall be sewn with cotton thread and covered with 40.9 kilograms (90 pounds) crepe tape, or shall be pinch, bottom-style paper bags having glued top and bottom seams.
- ◆ The bag shall permit no leakage of beads.

Glass traffic beads purchased by the Contractor for use on highway projects shall be packaged in 22.7 kilograms (50 pound) bags or bulk containers of a mutually agreed upon quality.

***Labeling***

Each container of glass traffic beads shall be distinctly marked and show the following:

- ◆ The name of the manufacturer
- ◆ Traffic beads and type
- ◆ Purchase order number
- ◆ Identification such as lot or load number so that the traffic beads may be identified with quantities not exceeding 22,000 kilograms (48,000 pounds) in weight, and
- ◆ Net weight.

**Material Requirements**

Glass traffic beads shall meet the following requirements:

***General***

- ◆ Manufactured predominately from recycled glass
- ◆ Spherical in shape
- ◆ Essentially free of sharp angular particles
- ◆ Essentially free of particles showing milkiness, surface imperfections, or air bubbles, and
- ◆ Water white in color.

***Contaminants***

- ◆ Contain less than 1/4 of one (1) percent moisture by weight
- ◆ Be free of trash, dirt, etc., and
- ◆ Show no evidence of objectionable static electricity when flowing through a regular traffic-bead dispenser.

***Gradation***

All glass traffic beads shall meet gradation requirements when tested in accordance with Test Method "Tex-831-B, Determining the Gradation of Glass Traffic Stripe Beads."

Sieve analysis for Types I, II, and III – Material collected in the pan shall be 2% maximum.

## ◆ Type I

<b>Glass Traffic Bead Gradation Requirements</b>		
<b>Opening (Micrometers)</b>	<b>Opening – U.S. Standard Sieves</b>	<b>Percent Retained</b>
850	(No. 20 Sieve)	0
600	(No. 30 Sieve)	5 – 20
300	(No. 50 Sieve)	50 – 80
150	(No. 100 Sieve)	10 - 35

## ◆ Irregular Particles

- Glass traffic beads, retained on any screen used to determine gradation requirements, shall not contain more than 30 percent (by weight) of irregular shaped particles.

## ◆ Type II

<b>Glass Traffic Bead Gradation Requirements</b>		
<b>Opening (Micrometers)</b>	<b>Openings – U.S. Standard Sieves</b>	<b>Percent Retained</b>
850	(No. 20 Sieve)	3 – 10
600	(No. 30 Sieve)	20 – 40
425	(No. 40 Sieve)	30 – 50
300	(No. 50 Sieve)	15 – 35
180	(No. 80 Sieve)	0 – 10

## ◆ Irregular Particles

- Glass traffic beads, retained on any screen, except the 850 micrometers (No. 20) used to determine gradation requirements, shall not contain more than 30 percent (by weight) of irregular shaped particles when tested in accordance with Test Method "Tex-832-B, Determining the Roundness of Glass Spheres."
- The 850 micrometers (No. 20 sieve) shall have 35 percent (by weight) maximum allowed irregular particles that shall be determined by visual inspection.

## ◆ Type III

<b>Glass Traffic Bead Gradation Requirement</b>		
<b>Opening (Micrometers)</b>	<b>Openings – U.S. Standard Sieve</b>	<b>Percent Retained</b>
1700	(No. 12 Sieve)	0
1400	(No. 14 Sieve)	0 – 5
1180	(No. 16 Sieve)	5 – 20
1000	(No. 18 Sieve)	40 – 80
850	(No. 20 Sieve)	10 – 40
710	(No. 25 Sieve)	0 – 2

## ◆ Roundness

- Roundness will be determined visually using an aspect ration of 1.2 maximum according to Test Method "Tex-832-B, Determining the Roundness of Glass Spheres." A composite sample of beads retained on sieve numbers 18, 20, and 25

shall contain a minimum of 80% round spheres. A composite sample of the beads retained on sieve numbers 12, 14, and 16 shall contain a minimum of 75% round spheres.

- ◆ Adhesion Coating
  - These beads shall come supplied with an adhesion coating, which will promote adhesion to both waterborne traffic paint and thermoplastic pavement marking material. The presence of the adhesion coating shall be tested according to Texas Test Method "Tex-833-B, Identifying Adhesion Coatings on Traffic Beads."

### ***Index of Refraction***

Glass traffic beads, when tested by Test Method "Tex-822-B, Determining Refractive Index of Glass Beads," using the liquid immersion method at 25 °C (77 °F), shall show an index of refraction within the range of 1.50 to 1.55.

### ***Stability***

Glass traffic beads shall show no tendency toward decomposition, surface etching, change in retroreflective characteristics, or change in color after:

- ◆ One hour exposure to concentrated hydrochloric acid at 25 °C (77 °F),
- ◆ 24-hour exposure to weak alkali, and
- ◆ 100 hours of Weather-Ometer (Atlas Sunshine Type) exposure (ASTM G 23, Method 1, Type EH).

## **Quality Monitoring Program (QMP)**

### ***Qualification***

Manufacturers who desire to qualify their product for the QMP should contact the Texas Department of Transportation, Construction Division, Director of Materials & Pavements Section (CP51), 125 East 11th Street, Austin, TX 78701-2483.

Upon request for qualification, a representative from CST/M&P will inspect the manufacturer's facilities. The manufacturer must show that it has quality control (QC) facilities that actively participate in the quality control of the product as determined by Test Method "Tex-820-B, Accrediting Quality Control (QC) Facilities."

The product must then meet the following requirements:

- ◆ Be of stable design, which means that there have been no substantive design changes (changes in composition or manufacturing process) which might affect the quality of the product,
- ◆ Have been manufactured on a continuous basis for at least six (6) months, and
- ◆ Have 10 consecutive lots pass all the material requirements of this specification.

If any of the three requirements listed above are not met, then the product cannot be placed on the QMP.

### ***Sampling***

Once approved for the QMP, the sampling frequency will be one composite sample per 227,000 kilograms (500,000 pounds) of material produced or one composite sample per 30 days if less than 227,000 kilograms (500,000 pounds) per month of material is produced.

Sampling will be performed at the manufacturer's facilities by either a TxDOT representative or an approved inspector.

Additionally, check samples will be taken from any warehouse or TxDOT project at least twice within a 12-month period.

### ***Probation***

Once on the QMP, if an inspected lot does not meet any of the material requirements, then the product will be placed on probation. All lots will be inspected during probation.

The quality monitoring sampling frequency will be reinstated if four (4) consecutive lots meet the material requirements during probation.

### ***Disqualification***

If any of the following conditions are met, then the product will be disqualified from the QMP:

- ◆ A lot is rejected during probation,
- ◆ No production activity for two months,
- ◆ The supplier deviates from supplier qualifications or product qualifications, or
- ◆ The Director of CST/M&P decides to return to lot by lot inspection.

### ***Requalification***

Material disqualified from the QMP may be submitted for requalification only after one year has elapsed from the time of disqualification.

To requalify, the material must pass the qualification phase again.