

DMS-8290, Glass Traffic Beads

Overview

Effective Date: May 2003 – July 2004.

This Specification governs for the materials, composition, quality, sampling, and testing of glass traffic beads.

Bidders' and Suppliers' Requirements

Before any material is considered, it must be of manufacture and product code or designation shown on the list of approved manufacturers of materials and maintained by the Construction Division, Materials & Pavements Section (CST/M&P).

Sampling and Testing

The Department will sample in accordance with "Tex-830-B, Sampling Traffic Beads," and will test in accordance with the methods listed in 'Material Requirements.'

Packaging and Labeling

Packaging

Provide packaged beads for State requisitions in 22.7 kg (50 lb.) bags constructed as follows:

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

Provide beads to Contractors for use on highway projects packaged in 22.7 kg (50 lb.) bags or bulk containers of a mutually agreed upon quality.

Labeling

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

- ◆ manufacturer's name;
- ◆ "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 kg (48,000 lb.) in weight; and
- ◆ net weight.

Material Requirements

Glass traffic beads must 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 1% 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 must meet gradation requirements when tested in accordance with "Tex-831-B, Determining the Gradation of Glass Traffic Stripe Beads."

Sieve analysis for Types I, II, and III – Material collected in the pan must be 2% or less.

Type I

Gradation Requirements for Type I		
Opening – Micrometers	Opening – U.S. Standard Sieves	Percent Retained
850	#20	0
600	#30	5 – 20

300	#50	50 – 80
150	#100	10 - 35

Irregular Particles - Glass traffic beads retained on any screen used to determine gradation requirements must not contain more than 30% (by weight) of irregular shaped particles.

◆ Type II

Gradation Requirements for Type II		
Opening – Micrometers	Openings – U.S. Standard Sieves	Percent Retained
850	#20	3 – 10
600	#30	20 – 40
425	#40	30 – 50
300	#50	15 – 35
180	#80	0 – 10

Irregular Particles - Glass traffic beads retained on any screen except the 850 mm (#20) used to determine gradation requirements must contain no more than 30% (by weight) of irregular shaped particles when tested in accordance with "Tex-832-B, Determining the Roundness of Glass Spheres." The 850 mm (#20) must contain no more than 35% (by weight) of irregular particles when determined by visual inspection.

Type III

Gradation Requirements for Type III		
Opening – Micrometers	Openings – U.S. Standard Sieve	Percent Retained
1700	#12	0
1400	#14	0 – 5
1180	#16	5 – 20
1000	#18	40 – 80
850	#20	10 – 40
710	#25	0 – 2

Roundness will be determined visually using an aspect ratio of 1.2 maximum according to "Tex-832-B, Determining the Roundness of Glass Spheres." A composite sample of beads retained on sieve numbers 18, 20, and 25 must contain a minimum of 80% round spheres. A composite sample of the beads retained on sieve numbers 12, 14, and 16 must contain a minimum of 75% round spheres.

These beads must 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 will be tested in accordance with "Tex-833-B, Identifying Adhesion Coatings on Traffic Beads."

Index of Refraction

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

Stability

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

- ◆ 1-hr. exposure to concentrated hydrochloric acid at 25°C (77°F),
- ◆ 24-hr. exposure to weak alkali, and
- ◆ 100 hr. of Weather-Ometer (Atlas Sunshine Type) exposure. Weather-ometer exposure will be in accordance with ASTM "G 153, Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials," using Exposure Cycle 1 (18 min. for water spray in every 120 min. of light exposure).

Quality Monitoring Program (QMP)

Qualification

Contact the Texas Department of Transportation, Construction Division, Director of Materials & Pavements Section (CP51), 125 East 11th Street, Austin, TX 78701-2483, to prequalify your product.

Upon request for qualification, a representative from CST/M&P will inspect the manufacturer's facilities. The manufacturer must show that they have quality control (QC) facilities that actively participate in the QC of the product as determined by "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 6 mos.; and
- ◆ have 10 consecutive lots pass all the material requirements of this Specification.

If any of the 3 is not met, then the product cannot be placed on the QMP.

Sampling

Once approved for the QMP, the sampling frequency will be 1 composite sample per 227,000 kg (500,000 lb.) of material produced or 1 composite sample per 30 days if less than 227,000 kg (500,000 lb.) per month of material is produced.

Sampling will be performed at the manufacturer's facilities by either a Department representative or an approved inspector. Additionally, check samples will be taken from any warehouse or Department project at least twice within a 12-mo. 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 4 consecutive lots meet the material requirements during probation.

Disqualification

If any of the following conditions occur, the product will be disqualified from the QMP:

- ◆ a lot is rejected during probation,
- ◆ no production activity for 2 mos.,
- ◆ 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 1 yr. has elapsed from the time of disqualification. To requalify, the material must pass the qualification phase again.

Archived Versions

Archived versions of "DMS-8290, Glass Traffic Beads" are available through the following links:

Click on [8290-0301](#) for the specification effective March 2001 through April 2003.