

DMS - 8290
GLASS TRAFFIC BEADS

EFFECTIVE DATE: AUGUST 2004

8290.1. Description. This Specification governs for the materials, composition, quality, sampling, and testing, and quality-monitoring program of glass traffic beads.

8290.2. Units of Measurements. The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

8290.3. Material Producer List. The Materials and Pavements Section of the Construction Division (CST/M&P) maintains the material producer list (MPL) of all materials conforming to the requirements of this Specification. Materials appearing on MPL, entitled "[Glass Traffic Beads](#)," require no further testing, unless deemed necessary by the Project Engineer or CST/M&P.

8290.4. Quality Monitoring Program (QMP).

- A. Pre-Qualification Request.** Prospective producers interested in submitting their product for evaluation must submit a written request to Texas Department of Transportation, Construction Division, Materials and Pavements Section (CP51), 125 East 11th Street, Austin, Texas 78701-2483.
- B. Inspection.** Upon request for acceptance to the QMP, 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.

The product must then meet the following requirements:

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

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

- C. Sampling.** Once approved for the QMP, the sampling frequency will be one composite sample per 227,000 kg (500,000 lb.) of material produced or one 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-month period.

- D. 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 QM sampling frequency will be reinstated if four consecutive lots meet the material requirements during probation.

- E. 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 months
- Supplier deviates from supplier qualifications or product qualifications
- Director of CST/M&P decides to return to lot-by-lot inspection

- F. Re-Qualification.** Material disqualified from the QMP may be submitted for re-qualification only after 1 year has elapsed from the time of disqualification. To re-qualify, the material must pass the qualification phase again.

- G. Periodic Evaluation.** The Department reserves the right to periodically evaluate the performance of materials, to randomly select samples from materials submitted on State purchase orders, and to perform random audits of test reports. Department representatives may sample material from the manufacturing plant, the project site, and the warehouse. CST/M&P reserves the right to test samples to verify compliance with this Specification. Failure of materials to comply with the requirements of this Specification as a result of periodic evaluation may be cause for removal of those materials from the MPL.

The Department will sample in accordance with Tex-830-B and will test in accordance with the methods listed in Article 8240.9.

8290.5. Packaging and Labeling.

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

- The bags must have a minimum of five plies, consisting of two plies of 22.7 kg (50 lb.) weight (minimum) natural Kraft paper, one ply of 0.02 mm (0.8 mil) high density polyethylene, and two plies of 22.7 kg (50 lb.) weight (minimum) natural Kraft paper.
- The 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.

B. 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
- Net weight

8290.6. Material Requirements.

A. General Requirements.

- 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
- Water-white in color

B. Contaminants.

- Contain less than 1/4 of 1% moisture by weight
- Free of trash, dirt, etc.
- Show no evidence of objectionable static electricity when flowing through a regular traffic-bead dispenser

C. Gradation. All glass traffic beads must meet gradation requirements when tested in accordance with Tex-831-B.

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

1. Type I.

Table 1
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.

2. Type II.

Table 2
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. The 850 mm (#20) must contain no more than 35% (by weight) of irregular particles when determined by visual inspection.

3. Type III.

Table 3
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 in accordance with Tex-832-B. 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.

D. Index of Refraction. Glass traffic beads, when tested in accordance with Tex-822-B, 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.

E. 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
- 100 hrs of Weather-Ometer (Atlas Sunshine Type) exposure. Weather-Ometer exposure will be in accordance with ASTM G 153 using Exposure Cycle 1 (18 min. for water spray in every 120 min. of light exposure)

8290.7. Archived Versions. Archived versions are available.