

ALBERTA TRANSPORTATION

Technical Standards Branch

GB-05

SPECIFICATION FOR GLASS BEADS

FOR PAVEMENT MARKINGS

The glass beads shall be suitable for application with Alberta Transportation's paint striping equipment.

The glass spheres shall be free of foreign matter, transparent and shall conform to the following requirements:

1. COLOUR

The glass spheres shall be colourless to the extent that they do not impart a noticeable daytime hue to white paint.

2. IMPERFECTIONS

- a. At least 75% by weight shall be true spherical shape as determined with a Roundness Tester in accordance with the latest edition of A.S.T.M. D1155 with the exception that the 80 µm (metric sieve size) portion will not be tested nor considered as part of the sample.
- b. The beads shall be smooth and lustrous and shall be free of air inclusions, dark specks, milkiness, incipient fractures, surface films, scratches, or other undesirable features, based on microscopic count.
- c. The total of reflective beads, as measured by microscopic count, plus round beads, as measured by the Roundness Test, shall exceed 70% by weight of original sample.

3. INDEX OF REFRACTION

The spheres, when tested by the liquid immersion method at 25°C shall exhibit an index of refraction of not less than 1.50.

4. SILICA CONTENT

The silica (SiO₂) content shall not be less than 60%.

5. **SIEVE ANALYSIS**

The spheres shall conform to the following gradation requirements:

6. **MOISTURE RESISTANCE OF GLASS SPHERES**

The beads shall also pass the following test for water repellency and free flow:

Place a 300 gram portion of the air-dry sample in a 300 ml Erlenmeyer flask; add 5 drops of water from a pipette calibrated to produce 20 drops per ml (+ 1 drop); stopper the flask immediately and shake the flask and its contents vigorously for at least one minutes; remove the stopper and connect the flask mouth-to-mouth to another air-dry flask of the same size in hour-glass fashion, by means of stoppers joined by a short glass tube having an inside diameter of 3/8"; invert the assembly and observe the flow qualities of the beads. The beads shall then flow continuously into the lower flask until the upper flask is emptied. The flask may be gently tapped to initially start the flow of beads, after which the beads shall flow continuously without further agitation. If, after three trials the beads fail to flow continuously, the sample shall be reported as not having acceptable flow qualities. A small quantity of beads sticking to the sides of the flask shall not be cause for rejection.

7. **CONTAMINANTS**

The maximum concentration of contaminants, as indicated below, in the glass beads is of:

Arsenic, 50mg/kg (50ppm)
Lead, 90mg/kg (90ppm)
Antimony, 75 mg/kg (75ppm)

GLASS BEADS REQUIREMENTS

Requirement	Colour	Imperfections		Index of Refraction (%)	Silica Content (SiO ₂) (%)	Sieve Analysis (% Passing)					Moisture Resistance
		Roundness (%)	Reflective (%)			GB-05 (5)					GB-05 (6)
Test Method	GB-05 (1)	ASTM D1155	GB-05 (2)	GB-05 (3)	GB-05 (4)	800	630	315	160	80	
Standard Alberta Local Bead	PASS	Min. 75	Min. 70	1.50	60%	100	90-100	16-38	0-10	0-3	PASS
Dual Silane Coated Bead	PASS	Min. 75	Min. 70	1.50	60%	100	75-95	15-35	0-5		PASS