



Note: The MUNI implemented in November 2021 replaces OPSS 1750 COMMON, December 1983 with no technical content changes.

MATERIAL SPECIFICATION FOR TRAFFIC PAINT REFLECTORIZING GLASS BEADS

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1750.01 SCOPE

This specification covers the requirements for glass beads for use with traffic paint and requirements for Owner purchase of reflectorizing glass beads.

1750.01.01 Specification Significance and Use

This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.

Use of this specification or any other specification shall be according to the Contract Documents.

1750.01.02 Appendices Significance and Use

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

1750.02 REFERENCES

When the Contract Documents indicate that municipal-oriented specifications are to be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications or publications:

ASTM Specifications

| | |
|-----------------|---|
| D1155-53 (1975) | Standard Test Method for Roundness of Glass Spheres |
| D1214-58 (1975) | Standard Method of Sieve Analysis of Glass Spheres |
| E11-81 | Wire Cloth Sieves for Testing purposes |

1750.05 MATERIALS

1750.05.01 Durability

The beads shall be manufactured from glass of a composition designed to be highly resistant to the effects of traffic wear and weathering.

1750.05.02 Colour

The glass shall be colourless to a degree that the resulting beads, when added to white paint, do not impart a noticeable hue.

1750.05.03 Bead Type and Grade

Beads shall be supplied in the Overlay Type and Moisture Proof Grade. The beads shall be treated in such a manner as to overcome the effects of water, as vapour or liquid, on the beads before the beads are added to the paint stripe.

1750.07 PRODUCTION

1750.07.01 Roundness

At least 70% by mass of the glass beads shall be true spheres.

1750.07.02 Gradation

The glass beads shall meet the following gradation requirements when tested according to ASTM D1214.

| US Standard ASTM E11 Sieve Series | Opening μm | Percentage Passing by Dry Mass |
|--------------------------------------|-----------------------|--------------------------------|
| | | Overlay Type |
| No. 20 | 850 | 100 |
| No. 30 | 600 | 95 - 100 |
| No. 40 | 425 | 45 - 70 |
| No. 50 | 300 | 20 - 40 |
| No. 70 | 212 | 5 - 20 |
| No. 100 | 150 | 0 - 3 |

1750.07.03 Refractive Index

The index of refraction of the glass beads, when tested by the immersion method at 25 °C under tungsten light, shall not be less than 1.50.

1750.07.04 Imperfections

The surface of the beads shall be smooth, lustrous, and free from film, scratches, and pits.

Not more than 25% by mass of the true spheres shall have imperfections such as milkiness, dark specks, incipient fractures, and air inclusions in the form of bubbles greater than 10% of the volume of the spheres.

1750.09 OWNER PURCHASE OF MATERIAL

1750.09.01 Sampling and Testing

1750.09.01.01 General

A maximum of 10% but no less than 1% of the total number of packages in each batch will be taken at random for test purposes by the Owner. The contents of each random package will be riffled until a representative sample of approximately 1000 g (or 500 ml) of beads is obtained. The 1,000 g samples will be combined to form a composite sample of about 4 kg (about 4 L in volume) representing a batch of 25,000 kg of beads. The composite sample will be riffled in the laboratory until about a 150 g sample is obtained for the following testing.

1750.09.01.02 Roundness Testing

The percentage true spheres shall be determined by one of the following methods:

a) By counting the beads under 50X and 100X magnification as follows:

- Glass beads larger than #50 sieve size inclusive, shall be counted under 50X magnification (see gradation requirements).

- Glass beads smaller than #50 sieve size shall be counted under 100X magnification.
- Approximately 1,000 beads contained loosely in a culture dish shall be counted under reflected light for each sieve specified to determine the percentage by mass of perfectly round spheres.

b) By ASTM D1155.

1750.09.01.03 Imperfections Testing

Imperfections shall be evaluated by observation under 50X and 100X magnification.

1750.09.01.04 Water Resistance Test

One hundred grams of glass beads will be placed in a 500 ml beaker and an equivalent volume of distilled water will be flowed into the beaker on top of the glass beads. The beaker will be permitted to stand for 5 minutes. At the end of this period, the water shall be poured off and the glass beads will be transferred to a clean, dry beaker and permitted to stand for 5 minutes. The spheres will then be introduced into a standard 125 mm diameter glass funnel having a stem of 125 mm length. The beads shall flow through the funnel without stoppage. Slight initial agitation to start the flow through the funnel at the beginning of the test will be permissible.

1750.09.02 Packaging

Beads in bags shall be free of clusters, lumps, moisture, and foreign matter.

Glass beads shall be packaged in bags of 25 kg net capacity and each bag shall be marked to show clearly the following information:

- a) Overlay Type Glass Beads
- b) Moisture Proof Grade
- c) MTC
- d) Batch number
- e) Manufacturer's name (marked in 25 mm high letters)

Bags shall be paper-lined burlap with 50 µm polyethylene inserts. The burlap liner, all seams and top closures shall be waterproof and leakproof and shall be capable of maintaining these properties during transportation and numerous handlings.

Bags shall be approximately 0.35 x 0.66 m with the 50 µm polyethylene insert being 0.35 x 0.96 m.

All bags shall be subject to prior approval by the Owner and shall be or be equal in quality to either:

- a) A Bemis Waterproof, Standard Type, single paper lined, cemented centre seam, taped bottom bag, produced by Bemis Bros. Bag Company, St. Louis, Missouri, U.S.A., or
- b) A Lloyd jute bag with polyethylene liner, Code #1010, produced by Lloyd Bag Company Limited, 114, St. Clair Street, Chatham, Ontario.

1750.09.03 Delivery

Delivery details and scheduling shall be as stipulated on the Owner's purchase order.

1750.09.04 Quality Assurance

Any shipment or shipments of this material supplied to the Owner shall be sampled and tested within a 30 day period immediately following the date of the delivery. Failure to meet the requirements of this specification shall constitute cause for rejection of the shipment. Upon rejection of the shipment, the letters "MTC" shall be made permanently illegible on each bag of the shipment. Rejected materials shall be expeditiously removed and replaced with acceptable materials at no additional cost to the Owner.

1750.09.05 Measurement and Payment

Measurement of beads shall be by kilograms.

Payment at the price specified in the purchasing order shall be for the supply of beads.

**Appendix 1750-A, November 2021
FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS**

Note: This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

Designer Action/Considerations

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

Related Ontario Provincial Standard Drawings

No information provided here.