

# DETERMINATION OF HEAVY METAL CONTENT IN GLASS BEADS INTENDED FOR USE IN PAVEMENT MARKING MATERIALS

## 1. SCOPE

This specification describes the procedure for determining the heavy metal content in glass beads intended for use in pavement marking materials.

## 2. PRINCIPLE

The heavy metal content is determined using a suitable method to determine that the values are less than the threshold values set by legislation or by contractual requirements.

## 3. METHOD OF TEST

The primary testing method to determine the composition of the glass beads shall be by acid digestion followed by ICP-MS (inductively coupled plasma mass spectrometer).

X-ray fluorescence (XRF) analysis is a suitable method to supplement ICP-MS as part of a quality system.

ICP-MS testing shall be carried out by a laboratory accredited by IANZ in New Zealand or NATA in Australia or accredited to ISO 17025 in other countries.

## 4. SAMPLING AND FREQUENCY

A sampling plan in accordance with the requirements of AS 1199 shall be prepared and sampling for testing shall be carried out in accordance with Appendix A of AS/NZS 2009.

ICP-MS testing shall be carried out on random samples taken at least once every six months.

XRF analysis may be undertaken regularly as part of a quality system to supplement ICP-MS testing.

## 5. HEAVY METAL LIMITS

Unless otherwise specified, the heavy metal content in glass beads shall be less than the following limits:

Contaminant	EGV Database Recommended Limit for Soil (mg/kg or ppm)	Notes from EGV Database
Arsenic	55	Dutch 2000 Intervention Values
Antimony	50*	Dutch 2000 Intervention Values
Lead	140	Canadian Guidelines for Residential/Parkland
Mercury	10	Dutch 2000 Intervention Values
Cadmium	12	Dutch 2000 Intervention Values
Chromium	10	A limit of 0.4 for Chromium VI is recommended in the Canadian Guidelines for Residential/Parkland/ Agricultural. However, only total chromium can be measured by ICP-MS.

\* Antimony limit: 50 ppm as an interim requirement, with a target of 15 ppm.

Except for chromium, these limits are based on international risk based heavy metal limits, using the Ministry for the Environment's Environmental Guideline Value (EGV) database (Ministry for the Environment, *Contaminated Land Management Guidelines No. 2 - Hierarchy and Application in New Zealand of Environmental Guideline Values*, June 2007).

## 6. REPORTING

The test report shall contain the following information:

1. Batch number of the glass beads
2. Name of supplier and country of origin of the glass beads
3. Name of the testing laboratory
4. Name of the person performing the test
5. Date on which the test was conducted
6. Location from where the sample was sourced
7. Listing of the results of the heavy metal content of the sample
8. Reference to the test method used
9. Reference to the sampling method used.