



# **Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014**

## **The electric arc furnace slag order 2014**

### **Introduction**

This order, issued by the Environment Protection Authority (EPA) under clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation), imposes the requirements that must be met by suppliers of electric arc furnace slag and blended electric arc furnace slag to which 'the electric arc furnace slag exemption 2014' applies. The requirements in this order apply in relation to the supply of electric arc furnace slag and blended electric arc furnace slag for application to land in line with the uses described in 'the electric arc furnace slag exemption 2014'.

### **1. Waste to which this order applies**

- 1.1. This order applies to electric arc furnace slag and electric arc furnace slag blended with other materials (blended electric arc furnace slag). In this order, electric arc furnace slag means waste sourced from steels produced by the Electric Arc Furnace steelmaking process and is formed after the molten solution of silicates and oxides cools and solidifies. Electric arc furnace slag does not include any bag house dust or air pollution control residues.

### **2. Persons to whom this order applies**

- 2.1. The requirements in this order apply, as relevant, to any person who supplies electric arc furnace slag or blended electric arc furnace slag that has been generated, processed or recovered by the person.
- 2.2. This order does not apply to the supply of electric arc furnace slag or blended electric arc furnace slag by any person to a consumer for land application at a premises for which the consumer holds a licence under the POEO Act that authorises the carrying out of the scheduled activities on the premises under clause 39 'waste disposal (application to land)' or clause 40 'waste disposal (thermal treatment)' of Schedule 1 of the POEO Act.

### **3. Duration**

- 3.1. This order commences on 24 November 2014 and is valid until revoked by the EPA by notice published in the Government Gazette.

### **4. Generator requirements**

The EPA imposes the following requirements on any generator who supplies electric arc furnace slag.

## **Sampling requirements**

- 4.1. On or before supplying electric arc furnace slag, the generator must:
  - 4.1.1. Prepare a written sampling plan which includes a description of sample preparation and storage procedures for the electric arc furnace slag.
  - 4.1.2. Undertake sampling and testing of the electric arc furnace slag as required under clauses 4.2 and 4.3 below. The sampling must be carried out in accordance with the written sampling plan and Australian Standard 1141.3.1-2012 Methods for sampling and testing aggregates – Sampling – Aggregates (or equivalent).
- 4.2. Where the electric arc furnace slag is generated as part of a continuous process, the generator must undertake the following sampling:
  - 4.2.1. Characterisation of the electric arc furnace slag by collecting 20 composite samples of the waste and testing each sample for the chemicals and other attributes listed in Column 1 of Table 1. Each composite sample must be taken from a batch, truckload or stockpile that has not been previously sampled for the purposes of characterisation. Characterisation must be conducted for electric arc furnace slag generated and processed during each 1-year period following the commencement of the continuous process; and
  - 4.2.2. Routine sampling of the electric arc furnace slag by collecting either 5 composite samples from every 2,000 tonnes (or part thereof) processed or 5 composite samples every 3 months (whichever is the lesser); and testing each sample for the chemicals and other attributes listed in Column 1 of Table 1 other than those listed as 'not required' in Column 3. Each composite sample must be taken from a batch, truckload or stockpile that has not been previously sampled for the purposes of routine sampling. However, if characterisation sampling occurs at the same frequency as routine sampling, any sample collected and tested for the purposes of characterisation under clause 4.2.1 may be treated as a sample collected and tested for the purposes of routine sampling under clause 4.2.2.
- 4.3. Where the electric arc furnace slag is not generated as part of a continuous process, the generator must undertake one-off sampling of a batch, truckload or stockpile of the electric arc furnace slag, by collecting 10 composite samples from every 2,000 tonnes (or part thereof) generated and testing each sample for the chemicals and other attributes listed in Column 1 of Table 1.

## **Chemical and other material requirements**

- 4.4. The generator must not supply electric arc furnace slag to any person if, in relation to any of the chemical and other attributes of the electric arc furnace slag:
  - 4.4.1. The concentration or other value of that attribute of any sample collected and tested as part of the characterisation or the routine or one-off sampling of the electric arc furnace slag exceeds the absolute maximum concentration or other value listed in Column 4 of Table 1, or
  - 4.4.2. The average concentration or other value of that attribute from the characterisation or one-off sampling of the electric arc furnace slag (based on the arithmetic mean) exceeds the maximum average concentration or other value listed in Column 2 of Table 1, or

4.4.3. The average concentration or other value of that attribute from the routine sampling of the electric arc furnace slag (based on the arithmetic mean) exceeds the maximum average concentration or other value listed in Column 3 of Table 1.

4.5. The absolute maximum concentration or other value of that attribute in any electric arc furnace slag supplied under this order must not exceed the absolute maximum concentration or other value listed in Column 4 of Table 1.

**Table 1**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Chemicals and other attributes</b>	<b>Maximum average concentration for characterisation</b> (mg/kg 'dry weight' unless otherwise specified)	<b>Maximum average concentration for routine</b> (mg/kg 'dry weight' unless otherwise specified)	<b>Absolute maximum concentration</b> (mg/kg 'dry weight' unless otherwise specified)
1. Mercury	0.5	Not Required	1
2. Cadmium	0.5	0.5	1
3. Lead	25	25	50
4. Arsenic	5	Not Required	10
5. Beryllium	5	Not Required	10
6. Boron <sup>1</sup>	NA	NA	NA
7. Chromium (total)	1%	Not Required	2%
8. Copper	150	150	300
9. Molybdenum	35	35	70
10. Nickel	50	50	100
11. Selenium	2	Not Required	5
12. Zinc	400	400	700
13. Leachable concentration (TCLP) of Chromium	1 mg/L	1 mg/L	2 mg/L
14. Leachable concentration (TCLP) of Copper	0.1 mg/L	0.1 mg/L	0.2 mg/L
15. Leachable concentration (TCLP) of Molybdenum	0.1 mg/L	0.1 mg/L	0.2 mg/L
16. Leachable concentration (TCLP) of Nickel	0.25mg/L	0.25mg/L	0.5mg/L
17. Leachable concentration (TCLP) of Zinc	2 mg/L	2 mg/L	4 mg/L
18. Electrical Conductivity <sup>1</sup>	NA	NA	NA
19. pH <sup>2</sup>	9 to 12.5	Not Required	8 to 13

<sup>1</sup>While limits are not included for electrical conductivity and boron, these must be tested in each sample and records kept of results.

<sup>2</sup>The ranges given for pH are for the minimum and maximum acceptable pH values in the electric arc furnace slag.

## Test methods

- 4.6. The generator must ensure that any testing of samples required by this order is undertaken by analytical laboratories accredited by the National Association of Testing Authorities (NATA), or equivalent.
- 4.7. The generator must ensure that the chemicals and other attributes (listed in Column 1 of Table 1) in the electric arc furnace slag it supplies are tested in accordance with the test methods specified below or other equivalent analytical methods. Where an equivalent analytical method is used the detection limit must be equal to or less than that nominated for the given method below.
- 4.7.1. Test method for measuring the mercury concentration:
- 4.7.1.1. Analysis using USEPA SW-846 Method 7471B Mercury in solid or semisolid waste (manual cold vapour technique), or an equivalent analytical method with a detection limit < 20% of the stated maximum average concentration in Table 1, Column 3 (i.e. < 0.1 mg/kg dry weight).
- 4.7.1.2. Report as mg/kg dry weight.
- 4.7.2. Test methods for measuring chemicals 2 - 12:
- 4.7.2.1. Sample preparation by digesting using USEPA SW-846 Method 3051A Microwave assisted acid digestion of sediments, sludges, soils, and oils.
- 4.7.2.2. Analysis using USEPA SW-846 Method 6010C Inductively coupled plasma - atomic emission spectrometry, or an equivalent analytical method with a detection limit < 10% of stated maximum average concentration in Table 1, Column 3 (i.e. 2.5 mg/kg dry weight for lead).
- 4.7.2.3. Report as mg/kg dry weight.
- 4.7.3. Test method for measuring attributes 13 - 17:
- 4.7.3.1. USEPA SW-846 Method 1311 Toxicity characteristic leaching procedure (or an equivalent analytical method).
- 4.7.3.2. Report as mg/L.
- 4.7.4. Test methods for measuring the electrical conductivity and pH:
- 4.7.4.1. Sample preparation by mixing 1 part electric arc furnace slag with 5 parts distilled water.
- 4.7.4.2. Analysis using Method 103 (pH) and 104 (Electrical Conductivity) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).
- 4.7.4.3. Report electrical conductivity in deciSiemens per metre (dS/m).

## Notification

- 4.8. On or before each transaction, the generator must provide the following to each person to whom the generator supplies the electric arc furnace slag:
- a written statement of compliance certifying that all the requirements set out in this order have been met;
  - a copy of the electric arc furnace slag exemption, or a link to the EPA website where the electric arc furnace slag exemption can be found; and

- a copy of the electric arc furnace slag order, or a link to the EPA website where the electric arc furnace slag order can be found.

### **Record keeping and reporting**

- 4.9. The generator must keep a written record of the following for a period of six years:
- the sampling plan required to be prepared under clause 4.1.1;
  - all characterisation, routine and/or one-off sampling results in relation to the electric arc furnace slag supplied;
  - the quantity of any electric arc furnace slag supplied; and
  - the name and address of the person(s) or companies to whom they supply electric arc furnace slag.
- 4.10. The generator must provide, on request, the most recent characterisation and sampling (whether routine or one-off or both) results for electric arc furnace slag that it supplies to any processor or consumer of the electric arc furnace slag.
- 4.11. The generator must notify the EPA within seven days of becoming aware that it has not met any requirements in clauses 4.1 to 4.7.

## **5. Processor requirements**

The EPA imposes the following requirements on any processor who supplies blended electric arc furnace slag.

- 5.1. The processor may only blend electric arc furnace slag with materials that are the subject of a Resource Recovery Exemption and Resource Recovery Order if that material complies with all of the chemical and other material requirements under its Resource Recovery Order, and is able to be applied to land under its Resource Recovery Exemption for the purpose(s) described in 5.1.1 and 5.1.2:
- 5.1.1. in cementitious mixes such as concrete, and
  - 5.1.2. in non-cementitious mixes such as an engineered fill in earthworks or for roadmaking activities as follows:
    - 5.1.2.1. sealing aggregate,
    - 5.1.2.2. asphalt aggregate,
    - 5.1.2.3. road pavement, base and sub-base structures,
    - 5.1.2.4. engineered fill,
    - 5.1.2.5. subsoil drains,
    - 5.1.2.6. filter aggregate.

### **Notification**

- 5.2. On or before each transaction, the processor must provide the following to each person to whom the processor supplies the blended electric arc furnace slag:
- a written statement of compliance certifying that all the requirements set out in this order have been met;
  - a copy of the electric arc furnace slag exemption, or a link to the EPA website where the electric arc furnace slag exemption can be found; and
  - a copy of the electric arc furnace slag order, or a link to the EPA website where the electric arc furnace slag order can be found.

## Record keeping and reporting

- 5.3. The processor must keep a written record of the following for a period of six years:
- the quantity of electric arc furnace slag received from the generator and the generators name and address.
  - the quantity of the blended electric arc furnace slag supplied; and
  - the name and address of each person to whom the processor supplied the blended electric arc furnace slag.
- 5.4. The processor must provide, on request, the most recent characterisation and sampling (whether routine or one-off or both) results for electric arc furnace slag supplied to any consumer of the electric arc furnace slag.

## 6. Definitions

In this order:

**application or apply to land** means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

**cementitious mixes** means either electric arc furnace slag or blended electric arc furnace slag which has been mixed with general purpose cement, lime and other activators for use in bound applications, where the materials must be chemically bound together.

**composite sample** means a sample that combines five discrete sub-samples of equal size into a single sample for the purpose of analysis.

**consumer** means a person who applies, or intends to apply, electric arc furnace slag or blended electric arc furnace slag to land.

**continuous process** means a process that produces electric arc furnace slag on an ongoing basis.

**generator** means a person who generates electric arc furnace slag for supply to a processor or consumer.

**non-cementitious mixes** means either electric arc furnace slag or blended electric arc furnace slag that is not mixed with general purpose cement, lime and other activators or used in bound applications.

**non-processing supplier** means a person who supplies, causes, or permits the supply of cementitious mixes to a consumer and who does not undertake any processing of electric arc furnace slag.

**processor** means a person who processes, mixes, blends, or otherwise incorporates electric arc furnace slag into blended electric arc furnace slag for supply to a consumer.

**transaction** means:

- in the case of a one-off supply, the supply of a batch, truckload or stockpile of electric arc furnace slag that is not repeated,
- in the case where the supplier has an arrangement with the recipient for more than one supply of electric arc furnace slag the first supply of electric arc furnace slag as required under the arrangement.

## Manager Waste Strategy and Innovation

### Environment Protection Authority

(by delegation)

## Notes

The EPA may amend or revoke this order at any time. It is the responsibility of each of the generator and processor and to ensure it complies with all relevant requirements of the most current order. The current version of this order will be available on [www.epa.nsw.gov.au](http://www.epa.nsw.gov.au)

In gazetting or otherwise issuing this order, the EPA is not in any way endorsing the supply or use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this order are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this order nor the accompanying exemption guarantee that the environment, human health or agriculture will not be harmed.

Any person or entity which supplies electric arc furnace slag should assess whether the material is fit for the purpose the material is proposed to be used for, and whether this use may cause harm. The supplier may need to seek expert engineering or technical advice.

Regardless of any exemption or order provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The supply of electric arc furnace slag remains subject to other relevant environmental regulations in the POEO Act and Waste Regulation. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 126), or does not meet the special requirements for asbestos waste (Part 7 of the Waste Regulation), regardless of this order, is guilty of an offence and subject to prosecution.

This order does not alter the requirements of any other relevant legislation that must be met in supplying this material, including for example, the need to prepare a Safety Data Sheet. Failure to comply with the conditions of this order constitutes an offence under clause 93 of the Waste Regulation.