



**A GUIDANCE NOTE ON THE  
BEST PRACTICABLE MEANS**

**FOR**

**CEMENT WORKS**

**(CONCRETE BATCHING PLANT)**

**BPM 3/2 (93)**

Environmental Protection Department  
Air Policy Group

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## **1. INTRODUCTION**

- 1.1 This Note is one of a series issued by the Environmental Protection Department to provide guidance on air pollution management for processes specified under Part IV of the Air Pollution Control Ordinance (the Ordinance). It also serves as a guide for the assessment of an application for Specified Process licence under the Ordinance.
- 1.2 It should be understood that this Note sets out the basic requirements for the applicant to provide and maintain the best practicable means for the prevention of emission of air pollutants. The applicant should recognize that whether a licence is granted or refused, and on what conditions, will depend on all the circumstances of an individual application besides the requirements set out in this Note. The Authority may devise specific requirements for individual facility carrying out the specified process.
- 1.3 This Note covers operations for the manufacture of cement and concrete products by batching cement and other materials which come within the specified process "Cement Works" described in Schedule 1 to the Ordinance as:

“Works in which the total silo capacity exceeds 50 tonnes and in which cement is handled or in which argillaceous and calcareous materials are used in the production of cement clinker, and works in which cement clinker is ground.”

## **2. EMISSION LIMITS**

- 2.1 All emissions to air, other than steam or water vapour, shall be colourless, free from persistent mist or fume, and free from droplets.
- 2.2 Emissions from specified and associated processes as covered by this Note shall not:
- (a) exceed the concentration limit set out in Annex I.
  - (b) appear to be as dark as or darker than Shade 1 on the Ringelmann Chart when compared in the appropriate manner with the Ringelmann Chart or an approved device.

## **3. FUEL RESTRICTION**

- 3.1 All fuels to be used shall comply with the Air Pollution Control (Fuel Restriction) Regulations in force.

## **4. CONTROL OF EMISSIONS**

- 4.1 Emission of air pollutants shall be minimized to prevent:
- (a) harm to the environment, adverse effects to human health, or creation of any nuisance situation;
  - (b) threatening the attainment or maintenance of the relevant air quality objectives;
  - (c) giving rise to an objectionable odour noticeable outside the premises where the process is carried out; and
  - (d) imposing undue constraint on the existing and future development or land use.
- 4.2 To satisfy the emission limits set out in Section 2 of this Note, prevention or reduction of emissions at source is the choice. Where the emission cannot be prevented or reduced at source to a sufficient extent to meet these requirements, air pollution control equipment shall be provided.
- 4.3 Clean energy sources and fuels with proven benefits to air pollution reduction shall be used whenever possible in the relevant specified process and associated operations. The use of electricity or gaseous fuel for process heating or production of goods is always recommended.
- 4.4 Wherever possible the final discharge point from particulate matter arrestment plant, where it is not necessary to achieve dispersion of the residual pollutants, should be at low level to minimize the effect on the local community in case of abnormal emissions and to facilitate maintenance and inspection.

## **5. OPERATION AND MAINTENANCE**

- 5.1 Requirements include not only the provision of the appliances, but the proper operation and maintenance of equipment, its supervision when in use and the training and supervision of properly qualified staff. Specific operation and maintenance requirements may be specified for individual equipment.
- 5.2 Malfunctioning and breakdown of the process or air pollution control equipment which would cause exceedance of the emission limits or breaches of other air pollution control requirements should be reported to the Authority within 3 working days.

## **6. FUGITIVE EMISSION CONTROL**

- 6.1 Boundary Ambient Standards

Total suspended particulates :  $260\mu\text{g}/\text{m}^3$  (24 hour average)

Respirable suspended particulates : 180µg/m<sup>3</sup> (24 hour average)

Odour : 2 odour units

*(Note: An odour unit is the measuring unit of odour level and is analogous to pollution concentration. In this context, the odour level is defined as the ratio of the volume which the sample would occupy when diluted with air to the odour threshold, to the volume of the sample. In other words, one odour unit is the concentration of odorant which just induces an odour sensation.)*

#### Engineering Design/Technical Requirements

- 6.2 To be agreed with the Authority. As a general guidance, the loading, unloading, handling and storage of fuel, raw materials, products, wastes or by-products should be carried out in a manner acceptable to the Authority so as to prevent the release of:
- (a) visible dust emission; and/or
  - (b) other noxious or offensive emissions.
- 6.3 Without prejudice to the generality of the above general requirements, the following control measures shall be implemented:

#### Cement and other dusty materials

- 6.4 The loading, unloading, handling, transfer or storage of cement, pulverised fuel ash (PFA) and/or other equally dusty materials shall be carried in a totally enclosed system acceptable to the Authority. All dust-laden air or waste gas generated by the process operations shall be properly extracted and vented to fabric filtering system to meet the emission limit stipulated in Section 2 of this Note.
- 6.5 Cement, PFA and/or other equally dusty materials shall be stored in storage silo fitted with audible high level alarms to warn of over-filling. The high-level alarm indicators shall be interlocked with the material filling line such that in the event of the silo approaching an overfilling condition, an audible alarm will operate, and after 1 minute or less the material filling line will be closed.
- 6.6 Vents of all silos shall be fitted with fabric filtering system to meet the emission limit stipulated in Section 2 of this Note.
- 6.7 Vents of cement/PFA weighing scale shall be fitted with fabric filtering system to meet the emission limit stipulated in Section 2 of this Note.
- 6.8 Seating of pressure relief valves of all silos shall be checked, and the valves reseated if necessary, before each delivery.

### Other raw materials

- 6.9 The loading, unloading, handling, transfer or storage of other raw materials which may generate airborne dust emissions such as crushed rock, sand, stone aggregate, shall be carried out in such a manner to prevent or minimize dust emissions.
- 6.10 The materials mentioned in paragraph 6.9 of this Note shall be adequately wetted prior to and during the loading, unloading and handling operations. Manual or automatic water spraying system shall be provided at all unloading areas, stock piles and material discharge points.
- 6.11 All receiving hoppers for unloading materials mentioned in paragraph 6.9 of this Note shall be enclosed on three sides up to 3 metres above the unloading point. In no case shall these hoppers be used as the material storage devices.
- 6.12 The belt conveyor for handling materials mentioned in paragraph 6.9 of this Note shall be enclosed on top and 2 sides with a metal board at the bottom to eliminate any dust emission due to wind-whipping effect. Other type of enclosure will also be accepted by the Authority if it can be demonstrated that the proposed enclosure can achieve same performance.
- 6.13 All conveyor transfer points shall be totally enclosed. Openings for the passage of conveyors shall be fitted with adequate flexible seals.
- 6.14 Scrapers shall be provided at the turning points of all conveyors to remove dust adhered to the belt surface.
- 6.15 Conveyors discharged to stockpiles of materials mentioned in paragraph 6.9 of this Note shall be arranged to minimize free fall as far as practicable. All free falling transfer points from conveyors to stockpiles shall be enclosed with chute(s) and water sprayed.
- 6.16 Aggregates with a nominal size less than or equal to 5 millimeters should be stored in totally enclosed structure such as storage bin and should not be handled in open area. Where there is sufficient buffer area surrounding the concrete batching plant, ground stockpiling may be used. The stockpile shall be enclosed at least on top and 3 sides and with flexible curtain to cover the entrance side.
- 6.17 Aggregates with a nominal size greater than 5 millimeters should preferably be stored in a totally enclosed structure. If open stockpiling is used, the stockpile shall be enclosed on 3 sides with the enclosure wall sufficiently higher than the top of the stockpile to prevent wind whipping.
- 6.18 The opening between the storage bin and weighing scale of the materials mentioned in paragraph 6.9 of this Note shall be fully enclosed.

### Loading of materials for batching

- 6.19 Concrete truck shall be loaded in such a way as to minimise airborne dust emissions. Without prejudice to the generality of this requirement, the following control measures shall be implemented:

- (a) Pre-mixing the materials in a totally enclosed concrete mixer before loading the materials into the concrete truck is recommended. All dust-laden air generated by the pre-mixing process as well as the loading process shall be totally vented to fabric filtering system to meet the emission limit stipulated in Section 2 of this Note.
- (b) If truck mixing batching or other types of batching method is used, effective dust control measures acceptable to the Authority shall be adopted. The dust control measures must have been demonstrated to the Authority that they are capable to collect and vent all dust-laden air generated by the material loading/mixing to dust arrestment plant to meet the emission limit stipulated in Section 2 of this Note.

6.20 The loading bay shall be totally enclosed during the loading process.

Vehicles

- 6.21 All practicable measures shall be taken to prevent or minimize the dust emission caused by vehicle movement.
- 6.22 All access and route roads within the premises shall be paved and adequately wetted.
- 6.23 Vehicle cleaning facilities shall be provided and used by all concrete truck after loading and other vehicles leaving the premises to wash off any dust and/or mud deposited on the wheels and/or vehicle body.

Housekeeping

- 6.24 A high standard of housekeeping shall be maintained. All spillages or deposits of materials on ground, support structures or roofs shall be cleaned up promptly by a cleaning method acceptable to the Authority. Any dumping of materials at open area shall be prohibited.

**7 MONITORING REQUIREMENTS**

7.1 Parameters and sampling frequency will be determined by the Authority. However, the following parameters should be monitored as specified below:

- (a) Process Monitoring

Total monthly raw input, product output and material stock (by manual recording), and other essential operating parameter(s) which may significantly affect the emission of air pollutants.

- (b) Ambient Monitoring

At site boundary and/or any other locations acceptable to the Authority

Total suspended particulates and/or respirable suspended particulates (at least one 24-hour sample per 6 calendar days)

## **8 COMMISSIONING**

- 8.1 Commissioning trials (to be witnessed by the Authority whenever appropriate) shall be conducted to demonstrate performance and capability of the air pollution control measures and a report of commissioning trial should be submitted to the Authority within 1 month after completion of the trial.

**ANNEX I CONCENTRATION LIMIT FOR EMISSION FROM CEMENT WORKS –  
CONCRETE BATCHING PLANT**

I.1 Air pollutant emissions from the subject specified process and associated processes as covered in this Note shall not exceed the concentration limit specified below. The air pollutant concentration is expressed at reference conditions of 0°C temperature, 101.325 kPa pressure, and without correction for water vapour content. Introduction of diluted air to achieve the emission concentration limit shall not be permitted.

<b>Air Pollutant</b>	<b>Concentration Limit</b>
Particulates	50 mg/m <sup>3</sup>