



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

**FOR**

**MINERAL WORKS**

**(STONE CRUSHING PLANTS)**

**BPM 11/1 (95)**

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 the specified process and associated processes for the below operations under “Minerals Works” as described in Schedule 1 to the Ordinance in which:
- (a) the processing capacity exceeds 5,000 tonnes per annum; and in which
  - (b) stones are subjected to any size reduction or grading by a process giving rise to dust, not being any works described in any other specified process.

## **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 the specified process 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 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.

### Engineering design / technical requirements

- 4.2 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 manner acceptable to the Authority so as to minimize the release of visible dust emission; and/or other noxious or offensive emissions.
- 4.3 Without prejudice to the generality of the above general requirements, the following control measures shall be implemented:

### Crushers

- 4.4 The outlet of all primary crushers, and both inlet and outlet of all secondary and tertiary crushers, if not installed inside a reasonably dust tight housing, shall be enclosed and ducted to a dust extraction and collection system such as a fabric filter. The particulate concentration at the exhaust outlet of the dust collector shall not exceed the emission limit stipulated in Section 2 of this Note.
- 4.5 The inlet hopper of the primary crushers shall be enclosed on top and 3 sides to contain the emissions during dumping of rocks from trucks. The rock while still on the trucks shall be wetted before dumping.
- 4.6 Water sprayers shall be installed and operated in strategic locations at the feeding inlet of crushers.
- 4.7 Crusher enclosures shall be rigid and be fitted with self-closing doors and close-fitting entrances and exits. Where conveyors pass through the crusher enclosures, flexible covers shall be installed at entries and exits of the conveyors to the enclosure.

### Vibratory screens and grizzlies

- 4.8 All vibratory screens shall be totally enclosed in a housing. Screenhouses shall be rigid and reasonably dust tight with self-closing doors or close-fitted entrances and exits for access. Where conveyors pass through the screenhouse, flexible covers shall be installed at entries and exits of the conveyors to the housing. Where containment of dust within the screenhouse structure is not successful then a dust extraction and collection system shall be provided. The particulate concentration at the exhaust outlet of the dust collector shall not exceed the emission limit stipulated in Section 2 of this Note.

- 4.9 All grizzlies shall be enclosed on top and 3 sides and sufficient water sprayers shall be installed at their feeding and outlet areas.

Belt conveyors

- 4.10 Except for those conveyors which are placed within a totally enclosed structure such as a screenhouse or those erected at the ground level, all conveyors shall be totally enclosed with windshield on top and 2 sides.
- 4.11 Effective belt scraper such as the pre-cleaner blades made by hard wearing materials and provided with pneumatic tensioner, or equivalent device, shall be installed at the head pulley of designated conveyor as required to dislodge fine dust particles that may adhere to the belt surface and to reduce carry-back of fine materials on the return belt. Bottom plates shall also be provided for the conveyor unless it has been demonstrated that the corresponding belt scraper is effective and well maintained to prevent falling material from the return belt.
- 4.12 Except for those transfer points which are placed within a totally enclosed structure such as a screenhouse, all transfer points to and from conveyors shall be enclosed. Where containment of dust within the enclosure is not successful, then water sprayers shall be provided. Openings for any enclosed structure for the passage of conveyors shall be fitted with flexible seals.

Storage piles and bins

- 4.13 Where practicable, free falling transfer points from conveyors to stockpiles shall be fitted with flexible curtains or be enclosed with chutes designed to minimize the drop height. Water sprays shall also be used where required.
- 4.14 The surface of all surge piles and stockpiles of blasted rocks or aggregates shall be kept sufficiently wet by water spraying wherever practicable.
- 4.15 All open stockpiles for aggregates of size in excess of 5 mm shall be kept sufficiently wet by water spraying where practicable.
- 4.16 The stockpiles of aggregates 5 mm in size or less shall be enclosed on 3 sides or suitably located to minimize wind-whipping. Save for fluctuations in stock or production, the average stockpile shall stay within the enclosure walls and in no case the height of the stockpile shall exceed twice the height of the enclosure walls.
- 4.17 Scattered piles gathered beneath belt conveyors, inside and around enclosures shall be cleared regularly.

Rock drilling equipment

- 4.18 Appropriate dust control equipment such as a dust extraction and collection system shall be used during rock drilling activities.

## **5. FUGITIVE EMISSION CONTROL**

### **5.1 Boundary Ambient Standards**

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

Respirable suspended particulates                180  $\mu\text{g}/\text{m}^3$  (24-hour average)

5.2 Fugitive emissions including emissions from stockpiles, conveyors and opening of structures shall be minimized as far as practicable. Emissions from these sources shall be substantially free from visible dust emission.

### **Material transportation**

5.3 Roadways for the transportation of final products off-site leading from the entrance of the Works shall be paved or hard surfaced for an agreed distance.

5.4 Active haul roads inside the Works shall be adequately wetted with water.

5.5 Exhausts of trucks for transportation of rock materials within the site, wherever practicable, shall be directed upward.

5.6 Wheel cleaning facilities shall be provided for delivery trucks leaving the Works for the removal of mud.

5.7 Trucks carrying crushed and screened products shall have their loads covered with tarpaulin sheets before leaving the premises.

5.8 The handling and storage of the dust collected by the dust collection system shall be carried out without fugitive particulate emissions.

### **Housekeeping**

5.9 A high standard of housekeeping shall be maintained. Any piles of materials accumulated on or around the relevant plant shall be cleaned up regularly.

## **6. OPERATION AND MAINTENANCE**

6.1 Chemical suppressants or wetting agents may be added in the water used in the spraying systems.

6.2 All spraying systems used for dust suppression shall be maintained in good condition and shall be used as required. The flow rate and operating pressure of the spraying liquid/solution shall be sufficient to suppress dust emissions from the corresponding sources. The spraying system shall be able to cover the areas of emission points concerned.

- 6.3 The dust extraction and collection system shall be routinely inspected and maintained in good condition and shall be used as required.
- 6.4 The owner shall conduct an inspection of the dust extraction and control system at least once per month on the inspection items to be agreed by the Authority.
- 6.5 Malfunctioning or breakdown of equipment leading to abnormal emissions shall be dealt with promptly. In any case, the abnormal emission due to equipment failure shall be stopped as soon as practicable.
- 6.6 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 shall be reported to the Authority within 3 working days

## **7. MONITORING REQUIREMENTS**

- 7.1 To ensure that the licensed works is capable of meeting the required limits, emission testing and inspections will be conducted. The frequency and time of sampling which will depend upon local circumstances and the potential air pollution impact of the works, are to be agreed by the Authority.
- 7.2 Monitoring of the 24-hour average concentration of the total suspended particulate and/or respirable suspended particulate in ambient air shall be conducted at the site boundary and/or any other locations to be agreed by the Authority. The sampling shall conform to the United State Environmental Protection Agency's Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-volume Method) and shall be conducted at a frequency of not less than once every 6 calendar days.
- 7.3 A written summary of the results of the analysis of the ambient particulate concentration at the site boundary and/or any other locations agreed by the Authority shall be submitted to the Authority on a monthly basis.
- 7.4 Total monthly raw material input, product output and material stock (by manual recording), and other essential operating parameter(s) which may significantly affect the emission of air pollutants shall be recorded and submitted to the Authority, wherever necessary [i.e. requested by the Authority to do so].

## **8. COMMISSIONING**

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

**ANNEX I CONCENTRATION LIMIT FOR EMISSION FROM MINERALS WORKS- STONE CRUSHING PLANTS**

I.1 Air pollutant emissions from the subject specified process and associated processes covered by 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>       |