
PROTOCOL FOR ENVIRONMENTAL MANAGEMENT

MINIMUM CONTROL
REQUIREMENTS FOR
STATIONARY SOURCES

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MINIMUM CONTROL REQUIREMENTS FOR STATIONARY SOURCES

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MINIMUM CONTROL REQUIREMENTS FOR STATIONARY SOURCES

1 INTRODUCTION

This Protocol for Environmental Management (PEM) is an incorporated document of the State environment protection policy (Air Quality Management) (SEPP (AQM)).

This PEM carries forward the requirements of Schedule F from the previous SEPP (AQM) on an interim basis. It is the intention of the Authority that all sections of this PEM be reviewed to establish whether they need to be retained and, if so, to update them to reflect best practice and the aims, principles and intent of the SEPP (AQM).

The development of any new PEM to replace a section in this PEM will be done in consultation with the relevant industry. On approval of the new PEM the relevant sections in this PEM will be removed.

The SEPP (AQM) will be interpreted in light of the requirements of this PEM. Best practice will be the main guiding principle in using the requirements of this PEM.

1.1 Purpose

This PEM provides a protocol for emission management from stationary sources outlining minimum control requirements and emission limits for particular industries and specific types of waste.

Proponents of new facilities for any of the activities listed in this PEM are advised to contact EPA for guidance prior to the design phase of their proposals.

1.2 Key Features of the Protocol

This protocol consists of the requirements in Schedule F of the SEPP (AQM) as published in the Government Gazette dated 13 July 1981, as amended by Orders in Council published in the Government Gazette dated 4 November 1981, 17 February 1982, 16 June 1982, 24 November 1982, 28 September 1983 and Special Government Gazette dated 6 June 1988, 31 July 1989 and 9 February 1999.

The following Schedules correspond to sections in the PEM.

Previous SEPP (AQM) Schedule	PEM Section
Schedule F-1 Iron Foundry Cupolas	Section 2.1
Schedule F-2 Concrete Batching Plants	Section 2.2
Schedule F-3 Wood Pulp Mills	Section 2.3
Schedule F-4 Textile Dyeing and Finishing Industry	Section 2.4
Schedule F-5 Chemical Plants Manufacturing either Ethylene Dichloride, Vinyl Chloride Monomer, or Polyvinyl Chloride	Section 2.5
Schedule F-6 Rendering Industry	Section 2.6
Schedule F-7 Aluminium Beverage Can and End Coating	Section 2.7
Schedule F-8 Heat Set Web Offset Lithographic Printing Plants	Section 2.8
Schedule F-9 Petroleum Refineries	Section 2.9
Schedule F-10 Reinforced Plastic Fabrication	Section 2.10
Schedule F-11 Safety Relief Flares	Section 2.11
Schedule F-12 Aluminium Bright Dip Anodising	Section 2.12
Schedule F-13 Powder Coating Lines	Section 2.13

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2 MINIMUM CONTROL REQUIREMENTS FOR STATIONARY SOURCES

2.1 Iron Foundry Cupolas

This section describes emission controls to be applied to cold and hot blast cupolas. For the purposes of this section all cold and hot blast cupolas shall comply with the minimum requirements described by Tables 1 and 2. In addition, those cupolas that give rise to justified complaints may be required to meet additional requirements on an individual basis as specified in licence conditions or air pollution abatement notices.

Table 1: Classification of Cupolas^a

Nominal melting capacity (C) ^b (tonnes/h)	In Air Quality Control Region				Not in Air Quality Control Region			
	Jobbing Cupola ^c		Other Cupola		Jobbing Cupola ^c		Other Cupola	
	Existing	New	Existing	New	Existing	New	Existing	New
Cold Blast								
(c) < 4	A	B	B	C	A	A	B	B
4 ≤ (c) ≤ 10	B	C	C	D	A	A	B	C
(c) > 10	C	C	D	D	B	B	C	C
Hot Blast All	D	D	D	D	D	D	D	D

a Refer Table 2 for description of requirements

b Nominal melting capacity (tonnes per hour) = 6.6 x Area at tuyere zone (m²)

c The Authority may classify certain cupolas as jobbing cupolas. In general, jobbing cupolas should not be operated for periods aggregating in excess of eight hours during any 30-day period. Operators of jobbing cupolas may be required to install equipment to record periods of operation.

Table 2: Description of Requirements

Classification	Description of Requirements		
A	Basic Requirements <ol style="list-style-type: none"> Smokeless light-up by gas or oil burner; Clean metallic charge, uncontaminated by non ferrous metals or non metallic matter; Shielding of charge materials from wind effects; Unimpeded vertical discharge; Discharge velocity not less than 6 metres per second at maximum blower rate; and Discharge height as specified in writing by the Authority. 		
B	Basic requirements plus a wet cap arrestor and associated equipment ^a		
C	1 Basic requirements plus equipment approved by the Authority to meet a discharge limit for particulates as follows:		
D	<table border="1"> <tr> <td>Nominal melting capacity (c) tonnes/h</td> <td>Discharge Limit mg/m^{3b}</td> </tr> </table>	Nominal melting capacity (c) tonnes/h	Discharge Limit mg/m ^{3b}
Nominal melting capacity (c) tonnes/h	Discharge Limit mg/m ^{3b}		

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(c) < 4	850
4 ≤ (c) < 6	750
6 ≤ (c) < 8	500
8 ≤ (c) ≤ 10	400
(c) > 10	250
Basic requirements plus equipment approved by the Authority to meet a discharge limit of 115 mg/Nm ³ for particulates	

(a) refer to EPA report No. 77/79 (1979) 'Requirements for Air Pollution Control of Iron Foundry Cupolas'.

(b) gas volumes are expressed at 25° C and at an absolute pressure of one atmosphere (101.325 kPa).

2.2 Concrete Batching Plants

This section describes emission controls to be applied to concrete batching plants. For the purposes of this section a concrete batching plant shall consist of the necessary equipment and facilities which are capable of producing at least 30 cubic metres of concrete per hour at maximum through-put. The requirements in Table 3 shall not apply to concrete batching plants that are integrated with and used solely for the manufacture of concrete products.

For the purposes of this section, all concrete batching plants shall comply with the minimum requirements described in Table 3. In addition, those plants that give rise to justified complaints may be required to meet additional requirements on an individual basis as specified by a works approval, licence conditions or a pollution abatement notice.

Table 3: Description of Requirements

General	
Boundaries	Where fences, walls, buildings or other barriers are inadequate to reduce and/or prevent windborne dust emissions being carried beyond the boundaries of the premises, screens of trees and shrubs shall be established and maintained.
Traffic	Roadways and footpaths shall be hard-surfaced and must be kept clean to prevent dust generation. Guide posts or other suitable barriers shall be placed along the edge of sealed roads to prevent traffic movement onto unsealed areas of the works.
Sand and Aggregate	
Delivery	Sand and aggregate shall be delivered in a completely wetted state. If material has dried out during transit, it must be re-wet prior to dumping.
Storage	Sand and aggregate shall be stored in hoppers or bunkers depending on site location ^a . Hoppers shall be fitted with effective water sprays to dampen stored material and for use on receipt of raw materials ^b . Bunkers shall enclose the stockpile on three sides with all walls extending above the pile and the side walls extending at least 2m beyond the front of the pile. Effective water sprays shall be provided to dampen stored materials and for use on receipt of

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	raw materials.
Transfer	<p>Conveyor belts shall be fully enclosed or fitted with windboards where these can be safely incorporated into the existing structure^{a,c}.</p> <p>Conveyor transfer points and hopper discharge areas shall be enclosed^d.</p> <p>Belt cleaners shall be fitted to the return side of conveyor belt.</p>
Cement	
Delivery	Cement shall be delivered in sealed vehicles equipped with means for pneumatic Transfer ^e .
Storage	<p>Cement shall be stored in dust-tight cement storage silos with hatches having dust-tight seals.</p> <p>The storage silo shall be vented to atmosphere through a filter fabric dust collector.</p> <p>The storage silo shall be provided with a level sensor, set not less than 0.7m below the top of the silo. When activated the sensor shall give an audible warning^f followed by an automatic cessation of the cement supply less than one minute later.</p>
Transfer	<p>Transfer from the delivery vehicle to storage shall take place without over-filling the silo.</p> <p>The storage silo shall be provided with means for accepting and dispensing cement without causing any visible emission.</p>
Fabric and Filter Dust Collector (FFDC)	<p>The fabric filter dust collector (FFDC) shall be housed so as to completely protect the filter elements from the weather and in a manner that is capable of withstanding at least 34.5 kilopascal pressure differential (5p.s.i.).</p> <p>The FFDC shall be adequately sized to cater for the maximum air volume.</p> <p>The filter elements shall be made of a material capable of withstanding continuous exposure to cement (e.g. polyester, polypropylene).</p> <p>The FFDC shall be provided with means for automatically cleaning filter elements at the conclusion of each silo filling operation.</p> <p>The FFDC shall be properly maintained with the filter elements being inspected at least once every seven days and any repairs being carried out immediately.</p>
Weigh and Gob Hoppers	<p>Cement shall be transferred from silo to weigh hopper and then to gob hopper without causing any visible emission.</p> <p>Weigh and gob hoppers shall be totally enclosed and vented through a FFDC having the same design characteristics as the one serving the silo.</p> <p>The FFDC shall be provided with means for automatically cleaning filter elements at the conclusion of each batching operation.</p> <p>Duct work associated with the silos, the weigh hopper and the gob hopper shall be dust-tight.</p>
Concrete	
Transfer	<p>The gob hopper outlet shall be fitted with a sleeve long enough to enter the hatch of any concrete mixing vehicle. This sleeve shall be made of a fabric capable of withstanding continuous exposure to concrete ingredients.</p> <p>The perimeter of the gob hopper outlet shall be equipped with effective water sprays set to operate automatically whenever a charge is dropped. Alternatively an effective dust extraction system may be used^a.</p>
Charging Station	The concrete mixing vehicle charging station may be required to be enclosed on each side and flexible doors provided at each end, if the above measures are ineffective.

- (a) The degree of control depends on individual circumstances, in particular the siting of the plant relative to housing and sensitive areas.
 (b) A three-side, roofed enclosure with a rubber curtain across the entry may be required if sprays are ineffective.

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- (c) Where a structure cannot safely incorporate either of these control measures, a detailed report is required outlining why compliance is not possible.
- (d) Double rubber curtain seals on transfer point outlets are recommended.
- (e) VicRail class J and JX wagons are suitable.
- (f) Visual alarms are acceptable where noise may cause local annoyance.

2.3 Wood Pulp Mills

This section describes control requirements to be applied to wood pulp mills. For purposes of this section wood pulp mills are divided into two broad categories:

- (a) Wood pulp mills using a combination of the Neutral Sulphite Semi-Chemical (NSSC) and Kraft process which shall be controlled by the minimum requirements described in sub-sections 2.3.1 and 2.3.3.
- (b) Wood pulp mills using only the Neutral Sulphite Semi-Chemical (NSSC) process which shall be controlled by the minimum requirements described in sub-sections 2.3.2 and 2.3.3.

Mills that give rise to justified complaints may be required to meet additional requirements on an individual basis, as specified by a works approval, licence conditions or a pollution abatement notice.

2.3.1 Description of Requirements

Tables 4 and 5 describe respectively the emission control and monitoring requirements for wood pulp mills in category (a).

Table 4: TRS^a Emission Control Requirements For Kraft NSSC Pulp Mills

Source	Description of Requirements		
	Emission Limit ppm ^d		Oxygen Reference Level ^e %
	Existing Source	New Source	
Digester, Evaporator and Condensate Stripper	Emissions shall be incinerated or controlled by a method of equivalent effectiveness		
Smelt Dissolver	Emissions shall not exceed 8.4mg/kg of Black Liquor Solids (dry weight) entering the Cross Recovery Furnace.		
Cross Recovery Furnace ^b	8	7	8
Lime Kiln ^c	20	10	8
Brown Stock Washer	5	5	10
Black Liquor Oxidiser	5	5	10

Footnotes subsection 2.3.1

- (a) TRS (Total Reduced Sulphur) compounds are defined as the sum of hydrogen sulphide, methyl mercaptan, dimethyl sulphide and dimethyl disulphide. TRS standards and monitoring results shall be expressed as hydrogen sulphide.
- (b) A Cross Recovery Furnace is defined as a process unit where Black Liquor from the Neutral Sulphite Semi-Chemical (NSSC) process is burnt in combinations greater than 10 per cent (v/v) with black liquor from the Kraft process and where the Black Liquor Solids from the NSSC process and Green Liquor Sulphidity leaving the Smelt Dissolver are greater than 7 per cent and 28 per cent (w/w) respectively, averaged over a calendar month. Existing Cross Recovery Furnaces: No more than one 12-hour average per week shall exceed 8ppm and at no time shall any 12-hour average exceed 20ppm. New Cross Recovery Furnaces: No more than one 12-hour average per week shall exceed 7ppm and at no time shall any 12-hour average exceed 20ppm.
- (c) New Lime Kilns: No more than one 12-hour average per week shall exceed 10ppm and at no time shall any 12-hour average exceed 20ppm.

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- (d) Parts per million (volume/volume) on a dry basis averaged over 12 consecutive hours. The averages represent continuous periods of 12-hours and not progressive or running averages.
- (e) Emission levels of TRS compounds are to be calculated at the specified oxygen reference level for each source:
- $$\text{Corrected Emission Level} = \frac{C_m (20.9 - \% O_2 \text{ reference})}{20.9 - \% O_2 \text{ measured}}$$
- C_m is the measured concentration of TRS compounds in ppm.

Table 5: Monitoring Requirements for Kraft NSSC Pulp Mills

Source ^a	Description of Requirements
Cross Recovery Furnace and Lime Kiln	Oxygen levels and TRS emissions shall be continuously measured and recorded ^b .
Digester, Evaporator and Condensate Stripper	Where emissions are incinerated the temperature of exhaust gases shall be continuously measured and recorded. Other monitoring as specified by licence.
Smelt Dissolver, Brown Stock Washer and Black Liquor Oxidiser	Intermittent or once-off monitoring of TRS emissions as specified by licence.

- (a) Refers to new and existing sources.
- (b) The current use of the continuous coulometric method for measuring TRS compounds will be the standard method, while consideration is given to establishing a more reliable standard method. An automated gas chromatograph capable of measuring individual TRS components is being considered as a possible replacement for the current method.

2.3.2 Description of Requirements

Tables 6 and 7 describe respectively the emission control and monitoring requirements for wood pulp mills in category (b).

Table 6: TRS Emission Control Requirements for NSSC Pulp Mills

Source ^a	Description of Requirement	Emission Limit ppm ^b	Oxygen Reference Level ^c % (volume/volume)
Spent (black) Liquor Recovery Plant ^d	Emissions shall be incinerated or controlled by a method equivalent effectiveness	1	5

- (a) Refers to new and existing source.
- (b) Parts per million (volume/volume) on a dry basis.
- (c) Emission levels of TRS compounds are to be calculated at the specified oxygen reference level.
- (d) Refer to Table 4 for the formula.
- (e) Spent (black) Liquor Recovery Plant is defined as a plant where spent (black) liquor from the Neutral Sulphite Semi-Chemical (NSSC) process is treated using process based on three unit operations-combustion, absorption and filtration.

Table 7: Monitoring Requirements of NSSC Pulp Mills

Source ^a	Description of Requirements
Spent (black) Liquor Recovery Plant Pollution Control Equipment	Oxygen levels and TRS emissions shall be continuously measured and recorded ^b .

- (a) Refers to new and existing sources.
- (b) The current use of the continuous coulometric method for measuring TRS compounds will be the standard method, while consideration is given to establishing a more reliable standard method. An automated gas chromatograph capable of measuring individual TRS components is being considered as a possible replacement for the current method.

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2.3.3 Design Criteria

This sub-section prescribes design criteria for a group of Class 2 indicators. The group of indicators are TRS (Total Reduced Sulphur Compounds) expressed as hydrogen sulphide.

CATEGORY (A) WOOD PULP MILLS

A design three-minute ground level concentration of 0.018ppm^a ($0.026\text{mg}/\text{m}^3$)^b shall be applied as a design criterion to emissions of TRS compounds from wood pulp mills in category (a) in the calculation of chimney heights by the procedure outlined in the Schedule C - Modelling for Emissions to Air.

CATEGORY (B) WOOD PULP MILLS

A design three-minute ground level concentration of one odour unit or its equivalent value in ppm or mg/m^3 expressed as hydrogen sulphide shall be applied as a design criterion in the calculation of chimney heights by the procedure outlined in Schedule C - Modelling for Emissions to Air.

(a) Equivalent to 0.01ppm averaged over one hour; parts per million volume/volume.

(b) Equivalent to $0.014\text{mg}/\text{m}^3$ averaged over one hour; gas volumes are expressed at 25°C and at an absolute pressure of one atmosphere (101.325 kPa).

2.4 Textile Dyeing and Finishing Industry

This section describes emission controls to be applied to the textile dyeing and finishing industry. For the purposes of this section, all textile dyeing and finishing plants shall comply with the minimum requirements described in Table 8. In addition, those plants that give rise to justified complaints may be required to meet additional requirements on an individual basis as specified by a works approval, licence conditions or a pollution abatement notice.

Table 8: Description of Requirements for Textile Dyeing and Finishing Plants

Process or Equipment	Basic Requirements
All	Every emission of waste is to have free vertical discharge via a chimney. Discharge velocity shall not be less than 8m per second for new plant or equipment unless otherwise specified. Chimney heights shall be designed in accordance with the requirements of the Schedule C - Modelling for Emissions to Air. The preparation of chemicals which give rise to emissions of waste during preparation shall be performed in an area(s) where emission capture facilities are provided. Records shall be kept, detailing the quantities and types of dye carriers ^a used per month.
Heat Setting Machines	Basic requirements plus equipment to capture and duct all emissions of waste from the heatsetting machine to a chimney(s). Goods containing excess volatiles ^b shall not be heat set or heat dried ^c .
Atmospheric Batch Dyeing Machines	It is preferable that dyeing be carried out using pressure dyeing machines. Where this is not possible, the following shall apply:

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- during dye carrier^d and/or sulphur dyeing operations, the basic requirements apply plus-only machines which are capable of being completely enclosed, including machines with ducted outlets, shall be used;
- machine doors shall remain closed during dyeing cycle except when sampling, or servicing is required;
- each machine must be provided with adequate seals to prevent the escape of emissions;
- seals must be inspected at least once every month and repaired if necessary.

If venting of waste is necessary during production, it must be via a flue(s) from each machine. All flues are to be ducted to a chimney(s)^{c,e}.

Every atmospheric dyeing machine shall have a permanently fixed identification number for EPA reference, until that machine is permanently removed from the premises.

Where specified by EPA the dye house area shall be provided with forced ventilators with the emissions ducted to a discrete discharge point(s). The exhaust system shall be designed to efficiently capture all emissions. Emissions are not permitted via roof ridges, windows and other openings which are not connected to a chimney.

Levelling or Stripping with Carriers	It is recommended that levelling or stripping be performed only in pressure vessels. Where this is not practical the conditions for enclosed atmospheric dyeing machines must be strictly adhered to.
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- (a) A dye carrier is defined as a compound used to increase the rate of dye uptake and diffusion at a given temperature.
- (b) Excess volatiles are defined as greater than 0.3 per cent of volatile material in the textile goods excluding water. Where the volatile content cannot be accurately estimated then measurements shall be made. The reference temperature for volatility is the maximum process temperature to which the goods will be subjected
- (c) Unless the exhaust gases are passed through a control device acceptable to EPA.
- (d) Minimising dye carrier usage and using a less odorous dye carrier will significantly reduce the emissions.
- (e) This requirement will not be applicable to operations not causing emissions of odorous waste to air. The Authority will accept submissions from companies seeking to be excluded from the requirement.

2.5 Chemical Plants Manufacturing either Ethylene Dichloride, Vinyl Chloride Monomer or Polyvinyl Chloride

This section describes control requirements for vinyl chloride monomer to be applied to plants^a manufacturing either ethylene dichloride (EDC), vinyl chloride monomer (VCM) or polyvinyl chloride^b (PVC).

Table 9: Description of Requirements for EDC, VCM and PVC Plants

General	
Captive VCM emissions	<ul style="list-style-type: none"> (a) All emissions shall be discharged freely upwards. (b) Efflux velocities shall not be less than 8m per second. (c) Chimney heights shall be designed in accordance with the requirements of the Schedule C - Modelling for Emissions to Air. (d) The number of emission points should be minimised. (e) Emissions to atmosphere shall be monitored as specified by licence. (f) Automatic means or other means acceptable to the Authority shall be provided to prevent VCM from entering equipment which is being vented to atmosphere.
Ambient monitoring	A continuous ambient monitoring and recording programme ^{e,f} shall be implemented
EDC Plants	

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EDC finishing	Emission limit 5ppm (volume/volume).
Oxychlorination reactors	Emissions to the atmosphere from each reactor shall not exceed 0.1g of VCM per kilogram of 100% EDC product ^g .
VCM Plants	
VCM formation and finishing	Emission limit ^g 5ppm
PVC Plants	
Reactors	<p>(a) Emissions to atmosphere from reactor openings shall not exceed 0.01 grams of VCM per kilogram of PVC^{g,h} product</p> <p>(b) Reactor opening shall be minimised.</p> <p>(c) No manual vent valve discharge shall occur except under circumstances of extreme emergency.</p> <p>(d) Reactors shall be equipped with an additional relief deviceⁱ which discharges to a VCM containment recovery or destruction system.</p>
Stripper(s)	<p>(a) Residual VCM level^j in latex resins shall not exceed 400ppm.</p> <p>(b) Residual VCM level^j in dispersion resins (excluding latex resins) shall not exceed 2000 ppm.</p> <p>(c) Residual VCM level^j in suspension resins shall not exceed 100ppm.</p>
Mixing, weighing and holding containers	Emission limit ^g 5ppm.
Monomer recovery system	Emission limit ^g either 5ppm or 0.01g/min.
Fugitive and Relief Emissions from EDC, VCM and PVC Plants	
Relief devices capable of discharging emissions to atmosphere	<p>(a) VCM emissions shall occur below design safety release pressure.</p> <p>(b) A comprehensive maintenance program^e for all pressure relief devices shall be implemented.</p> <p>(c) Rupture discs shall be installed between the equipment and the relief valve</p>
Loading and unloading lines	Line(s) shall contain less than 0.0038m ³ of VCM ⁱ before being opened to atmosphere.
Pump and agitator seals	VCM emissions shall be minimised by either double mechanical or outboard seals or by the use of sealless pumps.
Samples	No detectable VCM shall be discharged to atmosphere during sampling of equipment or from unused VCM samples.
Leak detection	A leak detection and elimination program ^e shall be implemented.
Opening of equipment	Before opening any equipment ^m the quantity of VCM shall be reduced to 2% of the volume of the vessel or 0.095m ³ of VCM ^l , whichever is the greater.
In-process waste	Emission limit ^g of 10ppm for each individual waste water stream before mixing with other in-process waste water stream(s).

- (a) Except research and development equipment provided the VCM reactor has a capacity of no more than 0.19m³.
- (b) PVC includes PVC copolymers.
- (c) Where an existing plant does not meet any of these requirements a date or dates for compliance shall be established by licence.
- (d) The details of the program(s) and/or report(s) shall be acceptable to EPA.
- (e) At least four transportable monitoring stations shall be located at the plant boundaries and an additional station, if required by the Authority, shall be located in a nearby residential area. The levels of VCM shall be monitored semi-continuously by taking 12 two-hour samples per day at each boundary station. The concentration of VCM in each sample shall be measured and recorded. This sampling requirement may be altered to one continuous sample in every 24 hours if the Authority considers that satisfactory performance has been demonstrated.

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- (f) The concentration of VCM in all exhaust gases discharged to atmosphere from each piece of equipment shall not exceed the specified limit except when the equipment has been opened in accordance with the requirement on "Opening of equipment".
- (g) On a dry solids basis
- (h) The additional relief device shall be set at a lower pressure than the main safety relief valve.
- (i) 24-hour weighted average of all grades of PVC resin measured immediately after the resin leaves the strippers).
- (j) At 0°C and an absolute pressure of one atmosphere (101.325 kPa).
- (k) VCM removed from the equipment in order to achieve the specified limit shall be recovered or destroyed.

2.6 Rendering Industry

This section describes control requirements to be applied to the rendering industry. For the purposes of this section, all rendering plants shall comply with the minimum requirements described in Table 10. In addition, those rendering plants that give rise to justified complaints, may be required to meet additional requirements, on an individual basis, as specified by a works approval, licence conditions or a pollution abatement notice.

Table 10: Description of Requirements for Rendering Plants

Rendering	
Processing	Material to be rendered down shall be processed as soon as possible after slaughter or death, to reduce the odours caused by decay.
Vapour Control	<ul style="list-style-type: none"> i. Existing Plant All cooker and pressing vapours shall be vented to odour removal equipment. Solid rendered material shall be removed to bagging area by enclosed conveyor. ii. New Plant <ul style="list-style-type: none"> (a) All new batch or continuous high temperature cooker plants shall totally enclose that area of plant comprised of raw material hoppers, cookers, percolators, centrifuges and presses. Vapour collection from these sources can be either separate or integrated with plant ventilation air extraction to odour removal equipment. Solid rendered material shall be removed as in (i) above. (b) A new continuous low temperature plant may be required to enclose raw material hoppers and cooker/dryer equipment.
Odour Removal	<p>The odour level of air discharged to atmosphere shall not exceed 200 odour units. Cooker and pressing vapours having levels higher than 200 odour units will be treated in odour removal equipment comprised of:</p> <ul style="list-style-type: none"> i. knock out box and condenser direct or indirect, and ii. fume incinerator or chemical wet scrubber, or iii. other equipment demonstrated to meet the odour emission limit requirements to the satisfaction of the Authority in consultation with the licensee. <p>Odour removal equipment shall operate such that the air discharged to atmosphere does not exceed an odour level of 200 odour units.</p> <p>For new plant with separate ventilation air extraction, the odour level in the ventilation air exhaust shall be determined in accordance with the dispersion requirements but shall not exceed 200 odour units. Building ventilation should be designed to bring ventilated air to a single point(s) so that odour removal equipment can be installed if necessary.</p>

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Odour Dispersion	The following dispersion requirements shall be met: <ol style="list-style-type: none"> i. Chimney heights shall be designed in accordance with the requirements of the Schedule C - Modelling for Emissions to Air. ii. Exhaust velocity, minimum of 6m per second and free vertical discharge.
Sampling Provisions	These shall comply with the EPA <i>Memorandum on Provision for Stack Emission Determinations</i> May 1977, on both existing and new plants. <ol style="list-style-type: none"> i. Fume incinerator- exhaust gas temperature shall be continuously measured and recorded. Temperature recording shall be marked to show true calendar date and time of day. Calibration records shall be kept of all instruments measuring and recording temperature. Temperature recordings and calibration records shall be retained for a minimum period of 6 months from the date of original record. ii. Wet scrubber- inlet temperature of scrubber shall be continuously indicated. Solution strength of scrubbing liquors shall be measured and recorded regularly as per licence conditions.
Emission Monitoring	<ol style="list-style-type: none"> i. Odour measurements shall be conducted whenever required in writing by the Authority using the EPA approved odour measurement method. ii. All other measurements shall use procedures acceptable to EPA.
Condensate Removal	Condensate shall be discharged to sewer wherever sewer connection is available. Where lagoon and land disposal is used, it may be necessary to take this additional odour into consideration.
Blood or Feather Drying	
Odour Emission	<ol style="list-style-type: none"> i. Existing plant. Odour level in the exhaust chimney gases from blood or feather drying process(es) shall not exceed 200 odour units. ii. New plant. All new plants shall totally enclose the dryer equipment such that vapour collection is either separate or integrated with plant ventilation air extraction. The odour level of the vapour collected shall not exceed 200 odour units.
Dispersion Requirements	As for rendering.
Visible Emission	No visible emission, except water vapour, is permitted from the chimney.

2.7 Aluminium Beverage Can and End Coating

This section describes control requirements to be applied to applicators of coatings to metal sheet, coil and cans used for aluminium beverage can and end manufacture. For the purposes of this section all coating plants within Air Quality Control Regions shall comply with the minimum requirements described in Table 11 during any day forecast by EPA Victoria as a day of high ozone potential. In addition, those plants that give rise to justified complaints may be required to meet additional requirements, on an individual basis, as specified by a works approval, licence conditions or a pollution abatement notice.

MINIMUM CONTROL REQUIREMENTS FOR STATIONARY SOURCES

Table 11: Description of Requirements

Coating Lines ^a , Not Fitted Emission with Control Equipment	Coating lines shall either employ compliant coatings ^b or a combination of compliant and non-compliant coatings provided the total emissions discharged to atmosphere, as calculated in the EPA <i>Volatile Organic Compounds (VOC)- Emission Chart</i> (Form AQS 29) is less than or equal to, that which would have resulted from the coating of the same number of sheets, coils or cans with compliant coatings.		
Compliant Coatings Deemed to Meet Compliance Criteria in the Absence of Odour Complaints	Coating Application	VOC ^c Specific Gravity (SG)	Maximum ^c VOC in Grams per Litre of Coating Solids
	Roller Coatings	0.88	555
	Interior Spray	0.85	1275
	End Seal Compound	0.66	1350
Coating Lines Fitted With Emission Control Equipment	No further requirements are necessary where the total of diffuse and point source VOC emissions is less than the calculated permissible level that would have resulted from the sole use of compliant coatings. The same rule as above will prevail in plants where controlled and uncontrolled lines operate, provided their total emissions are also less than the calculated permissible level.		
Status Reporting	<p>All plants that come within the scope of this section shall advise the Authority by 30 June each year, commencing 30 June 1988 of:</p> <ol style="list-style-type: none"> i. the compliance status^d; ii. measured VOC^e content of oven exhaust before and after the control equipment, as specified in the EPA standard analytical procedure; iii. any aspects that are likely to increase or reduce VOC emissions in the next 12 months; iv. proposed plan for achieving compliance, if the plant is considered non-compliant, and a timetable of events outlining any proposed reductions in VOC emissions. <p>These reporting requirements may be relaxed by the Authority once compliance has been achieved and maintained for a period of not less than three years.</p>		
New Premises	Any person proposing to establish a new plant shall first apply for works approval and shall provide evidence that VOC emissions will not exceed the criteria of a compliant plant.		
New Coating Lines ^f	Any existing plant proposing to operate a new coating line must, in addition to meeting new source emission standards for the new line, ensure that the operation of all lines also meet the appropriate compliance status applicable to the whole plant at the time operation commences.		

- (a) Coating line consists of any conveyor equipped with one or more of the following components: cleaning or degreasing tank; surface coating or sealant applicator; volatile organic compound extraction hood or canopy; drying or curing oven and associated particulate; and/or gaseous control devices.
- (b) Compliant coating includes any coating, spray or sealant having a VOC content equal to or less than that specified for the corresponding category in Table 11, when applied to any can, sheet or coil to be used in the manufacture of aluminium beverage cans.
- (c) For the purpose of completing a VOC-Emissions Chart, the costing supplier's data may normally be used. In the event that audit tests are required, the following ASTM Standard Test Methods shall be applied.
- (i) Volatile Organic Carbon (VOC) *ASTM D 3960-81*
 - (ii) Non Volatile Content ("solids") *ASTM D 3960-81 (ASTM D 2369-81 Procedure B)*
 - (iii) Water Content ("water") *ASTM D 3960-81 (ASTM D 3792-79 or ASTM D 4017-81)*

MINIMUM CONTROL REQUIREMENTS FOR STATIONARY SOURCES

- (a) Volatile organic compounds (VOC) means the sum of all compounds of carbon which contain at least one carbon to carbon bond plus methane and its derivatives, which evaporate from a coating or resin film under appropriate ASTM test conditions.
- (b) A plant is considered to be in compliant status when its daily (diffuse and specific) discharges of VOC during any day of high ozone potential are equal to or less than the emissions that would result from the exclusive application of compliant coatings. A day of high ozone potential, as forecast by EPA, is a day on which ozone is predicted to exceed 0.10ppm (one hour average) within the Air Quality Control Region. Forecast days are announced through the media on the day prior to a day of high ozone potential.
- (c) For the purposes of this schedule the VOC content of the exhaust gas shall be equivalent to the measured TOC content where, TOC, Total Organic Compounds, means the sum of all compounds of carbon which contain at least one carbon to carbon bond plus methane and its derivatives. For the purposes of measurement 1 gram of TOC shall be deemed to have the same flame ionisation response as 1g of hexane.
- (d) Any coating line that is about to be put into operation in addition to one or more fines declared to have been in operation regularly or occasionally.

2.8 Heat Set Web Offset Lithographic Printing Plants

This section describes control requirements to be applied to heatset web offset lithographic printing plants. For the purposes of this section, all heat set web offset lithographic printing plants printing on paper in more than two colours shall comply with the minimum control requirements described in Table 12. In addition, those plants that give rise to justified complaints may be required to meet additional requirements on an individual basis as specified by a works approval, licence conditions or a pollution abatement notice.

Table 12: Description of Requirements ^a

Process Drying Oven	All emissions from the drying ovens are to be captured and vented to either a direct fired afterburner or a catalytic afterburner.
Afterburner (Direct Fired or Catalytic)	
Emission limits	<ul style="list-style-type: none"> i. Total Organic Compounds not to exceed 0.020gram per cubic metre^{b,c}. ii. Carbon monoxide not to exceed 0.1gram per cubic metre^b. iii. Nitrogen oxides not to exceed 0.04gram per cubic metre^b. iv. No visible emission.
Temperature Recording	The exhaust gas temperature shall be continuously measured and recorded. Calibration records shall be kept of all instruments measuring and recording temperature. Temperature and calibration records shall be retained for a minimum period of six months from the date of original record.
Sampling Provisions	Sampling provisions shall be provided which comply with the EPA Memorandum on Provision for Stack Emission Determinations, May 1977.

- (a) These requirements shall not apply to existing plants fitted with emission controls unless specified by EPA in response to justified complaints. (See definition SEPP Amendments *Victoria Government Gazette* No. 120, 24 November 1982).
- (b) Gas volumes are expressed as dry at 0°C and an absolute pressure of one atmosphere (101.325kPa).
- (c) Total Organic Compounds (TOC) means the sum of all compounds of carbon that contain at least one carbon to carbon bond plus methane and its derivatives. For the purpose of measurement 1g of TOC shall be deemed to have the same flame ionisation response as 1g of hexane.

2.9 Petroleum Refineries

This section describes control requirements to be applied to petroleum refineries. For the purposes of this schedule, petroleum refineries shall be divided into two classes^a. Class A refineries shall comply with the minimum control requirements described in Tables 13 and 16. Class B refineries shall comply with the minimum control requirements described in Tables 13, 14, 15 and 16.

In addition, those petroleum refineries that give rise to justified complaints may be required to meet additional requirements on an individual basis as specified by a works approval, licence conditions or a pollution abatement notice.

Table 13: Volatile Organic Compound Emissions

Vacuum Producing System	Non-condensable organic vapours from vacuum producing systems shall be incinerated or otherwise controlled to minimise emissions of the vapours to atmosphere. Vapours from hot wells and/or accumulators associated with vacuum systems shall be collected and incinerated or otherwise controlled to the satisfaction of the Authority to minimise emission of the vapours to atmosphere.
Process Vessel	Organic vapours from process vessels shall not be vented to atmosphere until the internal pressure is less than 133kPa (4 to 6psig). Organic vapours from process vessel depressurisation shall be recovered or incinerated until the desired opening pressure is reached.
Leak Detection and Repair Programs	All refineries shall carry out a leak detection and repair program for pump and compressor seals, valves and pipe flanges in accordance with Table 17 and the requirements below. ^b
Valves	A leak detection and repair program shall be performed at intervals of not greater than three months for all active valves within refineries.
Pump Seals	A leak detection and repair program shall be performed at intervals of not greater than three months for all pump seals within refineries.
Pipe Flanges	A leak detection and repair program shall be performed for all pipe flanges that are opened for maintenance. The program may be carried out within 14 days of the commencement of operations or at operating pressure and ambient temperature before process start-up.
Compressor Seals	A leak detection and repair program shall be performed at intervals of not greater than three months for A compressor seals within refineries.
Non-leaking components	Active valves, pump and compressor seals which do not exceed the leak definition as defined in Table 17 at two consecutive quarterly inspections shall thereafter be inspected annually.
Relief Valves	Emissions from relief valves, other than pressure relief emissions, shall be controlled by either: <ol style="list-style-type: none"> i. a leak detection and repair program as detailed in Table 17; or ii. a closed system which vents to atmosphere via the flare system; or iii. rupture disks.

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Table 14: Odour Control

Odour Audits ^c	Odour audits shall be conducted annually during the months of January, February or March to identify sources of diffuse odour emissions within petroleum refineries. Reports detailing the significance of odour sources and explanations for the emissions shall be submitted to EPA before 30 April each year.
Significant Sources	Persons operating petroleum refineries shall prepare and submit plans to EPA for the control of odour sources which have been shown to give rise to justified complaints beyond the boundary of the plant

Table 15: Source Performance Requirements

Catalytic and Thermal Cracking Units	<p>Emissions of carbon monoxide from cracking unit regeneration kilns shall not exceed 1,000 ppm by volume.</p> <p>Particulate emissions from cracking units shall not exceed a concentration of 0.5 grams per cubic metre ^d.</p> <p>The opacity of gases emitted from catalytic and thermal cracking units shall be continuously measured and recorded by an instrument approved by the Authority.</p>
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Table 16: Sulphur Emissions

Sulphur Recovery	<p>During such times as necessary due to the maintenance or breakdown of a sulphur recovery unit or when hydrogen sulphide production falls below the operational levels for the sulphur recovery unit:</p> <ol style="list-style-type: none"> i. sour gas stream shall be incinerated in a system designed to completely oxidise hydrogen sulphide to sulphur dioxide and discharged to atmosphere so that any visible plume is minimised; ii. sour gas streams shall be directed to a back-up sulphur recovery unit. If backup facilities are not available the refinery shall ensure that within 4 four hours action is initiated so that only low sulphur crude oils are processed during these events; or iii. sour gas streams shall not be flared except as an emergency measure.
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Table 17: Leak Detection and Repair Program

Definition	A leak shall be defined as a discharge of visible mist or a Total Organic Compound (TOC) concentration measured as close as practicable to its source that exceeds 10,000 ppm ^e .
Monitoring	Leak monitoring shall be performed by slowly traversing the potential leak surface with the probe of a portable TOC detector ^f . If a leak is suspected the probe should be moved backward and forward over the site to determine the peak concentration and then held stationary for no less than 30 seconds.
Exemption	The detection and repair requirements of this table shall not apply to any equipment item which is inaccessible for reasons of worker safety, which handles a liquid with a Reid vapour pressure less than 0.4kPa (1.5psia) or which handles gases containing more than 90% methane and/or hydrogen.

MINIMUM CONTROL REQUIREMENTS FOR STATIONARY SOURCES

Leak Detection and Repair	<p>When a leak is detected:</p> <ol style="list-style-type: none"> i. The leaking components shall be identified by a numbered weatherproof tag. ii. The person operating the detection equipment shall record the tag number, the date and sufficient information to enable the source to be readily identified. iii. The leak shall be repaired^g within seven days if the source can be repaired without shutting down the process unit being served. iv. The leak shall be minimised within seven days if repair cannot be effected without shutting down the process unit being served. Leaks which cannot be repaired within seven days shall be repaired at the first available process turnaround. v. The numbered weatherproof tags shall not be removed until the component has passed two consecutive quarterly inspections.
Calibration	The portable TOC detector shall be calibrated daily using a reference gas of equivalent concentration to the leak definition.

- (a) Class A refineries shall be defined as any refinery which has as its principal operation the separation of crude oil into its major fractions. Excluded from this class are refineries with cracking facilities.
- (a) Class B refineries shall be defined as any refinery employing the processes used in Class A refineries and in addition cracking facilities, petrochemical manufacturing facilities or lubricating oil manufacturing facilities.
- (b) The leak detection and repair program applies to all pumps and compressors other than those fitted with double mechanical seals, all block or process control valves and all flanges with the exception of any item on a line with a nominal diameter less than 30mm.
- (c) An odour audit involves sensory evaluation of all areas of an industrial plant to identify odour sources, sufficient sensory or physical evaluation to rank the odour sources, and investigation of the major sources to determine reasons for the emissions.
- (d) Gas volumes are expressed as dry at 0°C and an absolute pressure of one atmosphere (101.325kPa).
- (e) Total Organic Compounds (TOC) means the sum of all compounds of carbon that contain at least one carbon to carbon bond plus methane and its derivatives. For the purpose of measurement 1g of TOC shall be deemed to have the same flame ionisation response as 1g of hexane.
- (f) The TOC detector shall conform to the following specifications.
- (e) The instrument shall be capable of measuring the leak concentration:
 - (i) The calibration precision shall not be greater than 10 per cent.
 - (ii) The response time shall be less than 30 seconds.
 - (iii) The scale sensitivity shall be at least 10 per cent of the leak definition.
 - (iv) The instrument shall be equipped with a pump and the sample flow rate shall be between 0.5 to 3.0 litres per minute.
 - (v) The analyser shall be intrinsically safe for operation in explosive atmospheres.
- (g) Repairs shall be considered as effective when the leak rate is reduced to the point where the leaking component passes the leak detection test.

2.10 Reinforced Plastic Fabrication

This section describes control requirements to be applied to Reinforced Plastics (RP) Fabricators^a. All RP fabricators shall comply with the minimum control requirements described in Tables 18, 19 and 20. In addition, those RP fabricators that give rise to justified complaints may be required to meet additional requirements on an individual basis as specified by a works approval, licence conditions or a pollution abatement notice.

Table 18: General Requirements

Emissions capture	<p>Emissions from lay-up and consolidation areas shall be captured and discharged freely upwards from an elevated discharge point.</p> <p>Efflux (exit) velocity shall not be less than 8m per second.</p>
Stack height	Stack heights shall be designed in accordance with the Schedule C - Modelling for Emissions to Air and a design ground level, concentration of one odour unit ^b

MINIMUM CONTROL REQUIREMENTS FOR STATIONARY SOURCES

Emissions Management	The amount of resin exposed to the atmosphere at any time shall be minimised by: <ol style="list-style-type: none"> i. keeping resin containers closed when not in use; ii. storing waste resin in closed containers; iii. mixing and handling wet resin in areas set aside for this purpose which are adequately ventilated.
Dust Emissions	Cutting or sanding of RP products shall not take place in areas where dust can be emitted from the factory building other than through an adequately designed bag filter or a device of similar collection efficiency. The removal, transfer and disposal of fibreglass dust shall cause no visible emissions.

Table 19: Low Styrene Emission Resins

No later than two years after the 6 June 1988, no fibreglass fabricator shall use any prescribed ^c resin, unless it is a low styrene emission resin as defined in footnote ^d except in applications which require high chemical resistance, high strength (e.g. pressure vessels) or any specific application approved by the Authority in writing.

Table 20: Spray Gun Technology

All new spray equipment purchased after 6 June 1988 shall be operated airlessly^e.

- (a) Applies to Fabricators employing processes other than marble casting, pressure-bag moulding, matched die moulding, continuous sheeting, pultrusion, hot moulding and resin injection moulding or any process which encloses the laminate for a significant portion of the gel time.
- (b) Odour unit is the dimensionless ratio of:
 - (i) the volume which the sample would occupy when diluted to the odour threshold to
 - (ii) the volume of the sample
 Odour is measured in accordance with *EPA Standard Analytical Procedure B2: Odour Dynamic Olfactometry*.
- (c) Prescribed resin means a resin containing in excess of 20% styrene and includes unsaturated polyester resins, vinyl ester resins, and bisphenolic resins but does not include gel coating resins.
- (d) A low styrene emission shall be defined as a resin with a styrene evaporation rate less than 20 gram per square metre at 23°C determined using the test procedure in *The Measurement of Styrene Evaporation from Unsaturated Polyester Resin (1982)*-British Plastics Federation.
- (e) Does not apply to air supplied to drive glass roving cutters.

2.11 Safety Relief Flares

This section describes control requirements to be applied to safety relief flare systems. All flare systems shall comply with the minimum control requirements described in Table 21.

In addition, safety relief flares that give rise to justified complaints may be required to meet additional requirements on an individual basis, as specified by a works approval, licence conditions or a pollution abatement notice.

Table 21: Minimum Control Requirements

Emission Requirements	All flare systems shall operate smokelessly under routine plant operating conditions and shall employ a staged design to promote smokeless combustion or shall be equipped with a steam or air suppression system ^{a,b,c,d} .
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MINIMUM CONTROL REQUIREMENTS FOR STATIONARY SOURCES

Liquid Knock Out	All flares receiving condensable gas streams shall be fitted with a liquid knock-out drum to minimise liquid entrainment into the flare.
Control of Smoke Suppressants	All refinery flares shall be fitted with a control system to sense flaring or the flow of gas to the flare system and automatically control the supply of smoke suppressant to the flare. AB petrochemical plant flares shall be fitted with: <ul style="list-style-type: none"> • an automatic control system as described above; or • an audible alarm to alert operators when flaring is occurring.
New Flare Systems	All new flare systems ^e shall be designed to minimise visible emissions by the application of the most appropriate flaring technology at the time of replacement ^f .

- (a) Routine plant operating conditions have been defined to include flaring resulting from scheduled plant startup, scheduled plant shutdown, continuous venting during normal operations and emergency releases at rates less than 10 per cent of the design capacity of the flare system for existing flares and 20 per cent of the design capacity for new flare systems.
- (b) Excludes water suppressed flares at the Esso Longford oil and gas plant, the Esso Long Island 'Point fractionation plant and pit flares equipped with water suppression systems.
- (c) Excludes the lag-time necessary to raise and deliver steam or air to the flare. This lag-time shall be determined and specified in air licences issued in accordance with this protocol. The lag-time mentioned above shall be minimised.
- (d) Excludes petrochemical plant flares which do not give rise to visible emissions for more than five hours in any year.
- (e) Includes reconstructed flare system but excludes flare tip replacements.
- (f) Companies seeking works approval from EPA for new flare systems shall submit a report evaluating the cost and performance of available flare system designs including staged flare systems and low level enclosed flare systems.

2.12 Aluminium Bright Dip Anodising

This section describes control requirements to be applied to aluminium bright dip anodising facilities. All bright dip anodisers shall comply with the minimum control requirements described in Tables 22, 23 and 24. In addition, bright dip anodisers that give rise to justified complaints may be required to meet additional requirements on an individual basis as specified by a works approval, licence conditions or a pollution abatement notice.

Table 22: Discharge Point Characteristics

Stack Heights	Stack heights shall be designed in accordance with the Schedule C - Modelling for Emissions to Air.
Duct Velocity	Exhaust stack and duct work shall be sized to give a mean gas velocity of not more than 9m per second in the ducting and exhaust stack ^a .
Efflux Velocity	Exhaust stacks shall be coned to give an efflux (exit) velocity which is not less than 1.5m per second.

Table 23: Nitrogen Dioxide Management

The formation of nitrogen oxides in bright dipping baths shall be minimised.	
Process Conditions	Process time, nitric acid concentration and bath temperature shall be minimised to the lowest values consistent with product quality.
Acid Additions	Nitric acid makeup to the baths shall be by way of small frequent additions at least every six racks.
Grease Removal	Items to be bright dipped shall be free of visible surface grease or similar impurities.
Lost Parts	Items of work lost in the baths shall be recovered immediately.

Table 24: Fume Scrubbing

All fume from bright dip baths shall be collected and discharged to atmosphere via a packed bed scrubber designed as follows:	
Exhaust Fan	The exhaust fan shall be located on the bath side of the scrubber.
Residence Time	The mean residence time of gas in the packing shall not be less than 0.55 seconds.
Liquor pH	The scrubbing liquor pH shall be maintained between 8 and 9 pH units using an automatic dosing system. Scrubbing liquor pH shall be continuously monitored and indicated. Means shall be provided to prevent the exhaust fan from operating unless the pump supplying liquor to the scrubbing unit is operating.

(a) This requirement shall not apply to existing bright dip anodisers with duct velocities exceeding nine metres per second in the absence of justified complaints. (See definition SEPP Amendments *Victoria Government Gazette* No. 120, 24 Nov. 1982).

2.13 Powder Coating Lines

This section describes control requirements for powder coating lines. For the purposes of this section all powder coating lines shall comply with the minimum control requirements described in Table 25. In addition, powder coating lines which give rise to justified complaints may be required to meet additional requirements on an individual basis as specified by a works approval, licence conditions or a pollution abatement notice.

Table 25: Minimum Control Requirements

Control Equipment	Powder coating lines shall be equipped with one of the following control devices fitted after the cyclone to further remove particulate matter from the exhaust gases: <ol style="list-style-type: none"> i. Fabric dust collector (FFDC); ii. Water scrubber system; iii. Any device of equivalent Performance to the above equipment.
FFDC	The FFDC shall be <ul style="list-style-type: none"> • adequately sized to cater for the maximum air volume^b. • fitted with a device to clearly and accurately indicate at all times the pressure differential across the fabric. • operated strictly in accordance with the manufacturers instructions.
Scrubbing systems	Water scrubbers shall be maintained to ensure that sludge does not accumulate and that water intakes do not become blocked. Water levels shall not drop below the operational levels for the scrubbing system.
Stack Height	All waste emissions to atmosphere shall be discharged freely upwards from a stack not less than 3m higher than any building or obstruction within 15m of the stack.

(a) Secondary control devices shall not be required on a manual powder booth provided the cyclones serving the booth are fitted with interlocks to ensure that the fan cannot be operated when the recovery bins are removed and a level indicator is provided to alert operators when the cyclone collection hopper is full.

(b) The air to cloth ratios for fabric filters serving powder booths may be varied depending on the type of cloth, size of booth and cleaning mechanism. But as a general guideline the following is recommended:

Air to Cloth Ratio: m ³ / min / m ²	
Mechanical shaker	0.4 - 0.6
Reverse air	0.4 - 0.6
Reverse pulse	1.5 - 2.0.