



OSPAR Recommendation 2000/3
on Emission and Discharge Limit Values for the Manufacture of Emulsion PVC
(e-PVC) from Vinyl Chloride Monomer

(Consolidated text¹)

OSPAR Recommendation 2000/3 adopted by OSPAR 2000 (OSPAR 00/20/1, Annex 10)

Amended by **OSPAR Recommendation 2006/1** (OSPAR 06/23/1, Annex 10)

RECALLING Article 2(1) of the Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention");

RECALLING paragraph 2 of Appendix I to the OSPAR Convention which identifies factors to which special consideration shall be given in determining whether a set of processes, facilities and methods of operation constitute the best available techniques in general or individual cases;

RECALLING OSPAR Decision 98/4 on Emission and Discharge Limit Values for the Manufacture of Vinyl Chloride Monomer (VCM) including the Manufacture of 1,2-dichloroethane (EDC) and OSPAR Decision 98/5 on Emission and Discharge Limit Values for the Vinyl Chloride Sector, applying to the Manufacture of Suspension-PVC (s-PVC) from Vinyl Chloride Monomer (VCM);

RECALLING the OSPAR Strategy with regard to Hazardous Substances (reference number 1998-16);

RECALLING that the OSPAR Action Plan 1998 - 2003 requires, *inter alia*, the development of descriptions of Best Available Techniques (BAT) and/or Best Environmental Practices (BEP) for certain identified sectors, sources and substances, *inter alia* the emulsion PVC industry;

RECALLING that the OSPAR Commission published, in 1999 an OSPAR BAT Description for Emulsion PVC and adopted OSPAR Recommendation 99/1 on Best Available Techniques for the Manufacture of Emulsion PVC (e-PVC);

NOTING Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC Directive) and corresponding legislation of other Contracting Parties;

RECOGNISING that the vinyl chloride industry has the potential to release significant amounts of organohalogens to the environment;

RECOGNISING that the release of chlorinated hydrocarbons arising in the manufacture of emulsion PVC can be minimised by applying BAT and BEP.

¹ The consolidated text integrates the basic OSPAR measure with subsequent amendments adopted by OSPAR in a single, non-official document to facilitate documentation. Only the basic OSPAR measure and the subsequent measures adopted by OSPAR to amend the basic measure are official documents.

THE CONTRACTING PARTIES TO THE CONVENTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT OF THE NORTH-EAST ATLANTIC RECOMMEND:

1. Definitions

1.1 For the purposes of this Recommendation:

- a. **"Existing plant"** means plant, the operation of which was authorised before 1 January 2001;
- b. **"New plant"** means plant, the operation of which was authorised on or after 1 January 2001;
- c. **"Fugitive emissions"** means releases of vinyl chloride monomer (VCM) into air due to leakages and other unspecified emissions;
- d. **"OSPAR BAT Description on e-PVC"** means OSPAR Description on "Best Available Techniques for the Emulsion Polyvinyl Chloride Industry" as published in 1999.

2. Purpose and Scope

- 2.1 This Recommendation covers the control of emissions, discharges and losses from the production of e-PVC from VCM with a view to limiting emissions and discharges of concern to the environment.
- 2.2 The discharge limit values in tables 2 and 3 apply to plants from which discharges may reach the maritime area of the OSPAR Convention by waterborne routes.
- 2.3 The emission limit values in table 1 apply to all plants of Contracting Parties.

3. Programmes and Measures

3.1 General provisions

- 3.1.1 When authorising or regulating point source emissions and discharges from individual plants, the competent authorities of Contracting Parties should base their decisions on the limit values set out in Tables 1-3, and take into account the technical information provided in the OSPAR BAT Description on e-PVC and bear in mind the following considerations:
 - a. the fact that the following emission and discharge limit values (based on annual averages) reflect what is currently generally achievable by e-PVC plants for the sector as a whole;
 - b. the type of processes used in the plant and the general level of emissions and energy consumption associated with those processes;
 - c. the findings of any integrated assessment of the relevant discharges, emissions and losses from the plant to all environmental mediums, in order to protect the environment as a whole;
 - d. product specification and the type of process used for stripping the latex which can both affect the concentration of VCM in both emissions and discharges;
 - e. the factors relating to BAT listed in paragraph 2 Appendix 1 to the OSPAR Convention.
- 3.1.2 For existing plants, the competent authorities should draw up, in consultation with the plant operators, an improvement programme so as to ensure that the plant performs to increasingly high standards with the aim of achieving the requirements of BAT. This may well mean setting stricter emission or discharge levels than those given in Tables 1-3 for certain individual plants.
- 3.1.3 The dilution of treated or untreated waste air or waste water streams for the purpose of compliance with limit values is not acceptable.

3.2 Emissions to air from point sources

3.2.1 Table 1 shows the limit values which should apply for emissions to air from point sources.

Table 1 Emission Limit Values

Type of Plant	Limit Value
Existing	900g VCM per tonne of e-PVC produced
New	500g VCM per tonne of e-PVC produced

3.2.2 As well as emissions to air during the manufacturing process itself, the limit values in Table 1 include any VCM which may enter the environment from PVC waste produced by the process, whether this be directly into air or water or soil.

Fugitive emissions to air

3.2.3 Fugitive emissions are not included in the limit values given in Table 1 and should be minimised as far as is possible. Fugitive emissions should be measured from the e-PVC production applying modern techniques.

3.3 Discharges to water

3.3.1 Table 2 shows the limit values which should apply for discharges at the outlet of the effluent stripper, before secondary treatment.

Table 2: Discharge Limit Values

Type of Plant	Limit Values
Plant only producing e-PVC	1 mg VCM per litre of water and 10 g VCM per tonne of e-PVC produced
Plant producing e-PVC + s-PVC at the same site	1 mg VCM per litre of water or 5 g VCM per tonne of PVC produced

3.3.2 Adsorbable organic halogen compounds (AOX) or extractable organic halogen compounds (EOX) can be used as optional alternative parameters for VCM, provided that a correlation, on a plant by plant basis, between AOX or EOX and VCM has been established and will be reported in the reporting on implementation.

3.3.3 Table 3 shows the limit values which should apply at the outlet of the effluent treatment plant and immediately before entering the marine or aquatic environment.

Table 3: Discharge Limit Values

Substance	Limit Values
Chemical Oxygen Demand (COD)	250 mg COD per litre of water
Suspended solids	30 mg suspended solids per litre of water

- 3.3.4 The main part of the suspended solids referred to in Table 3 are PVC particles. These suspended solids may be calculated from AOX if a correlation, on a plant by plant basis, between AOX and suspended solids has been established and will be reported in the reporting on implementation.
- 3.3.5 As an alternative to the discharge limit values for chemical oxygen demand (COD), a 90 % reduction of the load of COD may be applied.
- 3.3.6 As an alternative to COD as parameter, total organic carbon (TOC) may be used as a control parameter, provided that a correlation factor between COD and TOC has been established and will be reported in the reporting on implementation.

3.4 Sampling

- 3.4.1 Samples should be taken for analysis on the following basis:
- for emissions to the atmosphere, a sample, or a number of samples, representative of such emissions over a period of one hour;
 - for latexes and discharges to water, a sample, or a number of samples, representative of such discharges over a period of one day. Analysis of VCM (or AOX or EOX) should be performed on the basis of spot samples over a period of one day;
 - for VCM in PVC solid waste (“pebble”), a sample per day.
- 3.4.2 The frequency of sampling and analysis should be determined by competent authorities taking into account the results obtained.
- 3.4.3 Water samples should be homogenised, unfiltered and undecanted, where this is compatible with the analytical methodology specified in Table 4.
- 3.4.4 Care should be taken that the sample of PVC solid waste (“pebble”) is representative of production during the previous 24 hours. If the waste produced simultaneously from different streams is significantly different, then separate analysis followed by weight averaging is acceptable.

3.5 Analyses

- 3.5.1 The analytical methods set out in Table 4, or methods yielding equivalent results, should be used:

Table 4: Analytical methods

VCM	to be analysed by appropriate means, for example gas chromatography. In the case of VCM in solid PVC waste, techniques which involve dissolving the PVC in a suitable solvent are most appropriate, those techniques relying on gaseous diffusion of the VCM from the solid PVC are usually not (slow diffusion rates)
TOC	To be analysed in accordance with EN 1484
AOX, EOX	to be analysed according to ISO 9562 and EN 1485
COD	to be analysed by using potassium dichromate oxidation (see ISO 6060, second edition)
Suspended solids	to be determined in water effluent by filtration through glass fibre filters (see EN 872)

4. Entry into force

- 4.1 This Recommendation has effect from 30 June 2000. The programmes and measures in this Recommendation should be applied to:
- existing plants from 1 January 2004;

b. new plants from 1 January 2001.

4.2 In case of substantial technical modifications to an existing e-PVC plant, competent authorities should decide whether the provisions for existing plants in this Recommendation still apply for the modified plant.

5. Implementation reports

5.1 Reports on the implementation of this Recommendation should be submitted to the appropriate OSPAR subsidiary body for the first time in the intersessional period 2008/2009 for new and existing plants and every four years thereafter until this Recommendation is fully implemented unless otherwise specified by the Commission. When reporting on implementation, the format as set out in the Appendix should be used to the extent possible.

5.2 Where plants are not meeting the limit values given in Tables 1-3, brief details of improvement plans should be attached to the implementation reports.

Reporting format on the implementation and effectiveness of OSPAR measures relating to the vinyl chloride sector

Country: _____

I. Implementation

Measure	Reservation applies Yes ⁽¹⁾ /No	Is the measure applicable in your country? Yes/No ⁽²⁾	Is the measure fully implemented? Yes/No ⁽³⁾	Means of implementation ^{(4), (5)} 1. legislation 2. administrative action 3. negotiated agreement
PARCOM Decision 98/4 on Emission and Discharge Limit Values for the Manufacture of Vinyl Chloride Monomer (VCM) including the Manufacture of 1,2 dichloroethane (EDC)				
PARCOM Decision 98/5 on Emission and Discharge Limit Values for the Vinyl Chloride Sector, Applying to the Manufacture of Suspension-PVC (s-PVC) from Vinyl Chloride Monomer (VCM)				
OSPAR Recommendation 99/1 on the Best Available Techniques for the Manufacture of Emulsion PVC (e-PVC)				
OSPAR Recommendation 2000/3 on Emission and Discharge Limit Values for the Manufacture of Emulsion PVC (e-PVC) from Vinyl Chloride Monomer				

Note (1)

Please report on any progress towards lifting the reservation:

Note (2)

If the measure concerned is not applicable please state why (e.g. no relevant plant):

Note (3)

If the measure concerned is not fully implemented please state why and indicate when the measure is expected to be fully implemented:

Note (4)

Please specify the national measures taken to give effect to each of the measures:

Note (5)

Please specify any special difficulties encountered, such as practical or legal problems, in the implementation of each of the measures:

II. Effectiveness

Limit values for emissions and discharges

Please indicate the emissions and discharges of the substances and sum parameters listed in the tables for the following vinyl-chloride and PVC plants or installations. Where plants are operated in an integrated manner (an “installation”), plant-by-plant reporting is not required and reporting should cover the installation. Where an installation produced VCM and/or e-PVC and/or s-PVC, the reporting table should be combined ensuring that all parameters set out in the tables below were covered. Please give representative figure for each pollutant and- if possible- the observed range of figures from all plants.

Reporting on VCM and EDC parameters is on a voluntary basis.

Please also indicate - in brackets behind the figures – whether emission or discharge values are estimated (E), measured (M) or calculated (C). If data could not be made available, please indicate in the appropriate “remarks” section (e.g. if monitoring of substance in question is not specified in the permit for the plant or installation, and estimations or calculations are not available).

“Specific loads” are the amounts of emissions or discharges for each unit (usually tonne) of production that is produced in the year in question. “Total loads” are the amounts of emissions or discharges from the plant or installation in the year in question.

1. Vinyl Chloride Monomer (VCM) plants including manufacture of 1,2-dichloroethane (EDC) covered by OSPAR Decision 98/4

Please indicate number and capacity of VCM-plants/installations:

Total capacity (t VCM/year): _____

a. Emissions to air

Substances	Specific load ² In reporting year ^{3*} kg/tonne of VCM produced	Alternatively: Total load in reporting year kg/year (comparison with the base year) **	Alternatively: Concentration mg/m ³ ***
VCM			
EDC			
Dioxins	a)	a)	a)

* Please indicate under “remarks” how specific loads were calculated.

** If reporting total loads, please add a baseline load for (2001) and please indicate associated actual production of VCM and report under “remarks” when installed production capacities have changed.

*** Please indicate the associated volumetric flow-rate and whether fugitive emissions are included.

a) mg (TEQ)/tonne of VCM produced **or** mg (TEQ)/year **or** ng (TEQ)/Nm³.

² Wherever possible this parameter should be reported

³ The year for which data are to be reported in 2008/2009 is 2007.

b. Discharges to water

Substances	Specific load ⁴ In reporting year ^{5*} (°)	Alternatively: Total load in reporting year ** kg/year (°)	Alternatively: Concentration mg/l *** (°)
Chlorinated hydrocarbons (g/tonne EDC purification capacity) ^{a)}			
Copper (total) (g/tonne of oxychlorination capacity) ^{b)}			
Dioxins (µg TEQ/tonne oxychlorination capacity) ^{b)}			

- * Please indicate under “remarks” how specific loads were calculated.
- ** If reporting total loads, please add a baseline load for (2001) and please indicate associated actual production of VCM and report under “remarks” when installed production capacities have changed.
- *** Please indicate the associated volumetric flow-rate.

- a) To be sampled after stripper, before secondary treatment. Chlorinated hydrocarbons may alternatively be calculated from AOX or EOX if a correlation, on a plant-by-plant basis, has been established. The application of those alternatives should be described in the implementation report.
- b) To be sampled after final treatment.
- c) In brackets: (Number of samples).

c. Remarks: (i.e. explanation if change in production capacity in the country appeared, method to calculate specific loads)

⁴ Wherever possible this parameter should be reported
⁵ The year for which data are to be reported in 2008/2009 is 2007.

2. Suspension-PVC (s-PVC) covered by OSPAR Decision 98/5

Please indicate number and capacity of plants: _____

Total capacity (tonnes s-PVC/year): _____

a. Emissions to air

Substances	Specific load ⁶ In reporting year ^{7*} g/tonne of s-PVC produced	Alternatively: Total load in reporting year kg/year (comparison with the base year) **	Alternatively: Concentration mg/m ³ ***
VCM (point sources)			
VCM (fugitives)			

* Please indicate under "remarks" how specific loads were calculated.

** If reporting total loads, please add a baseline load for (2001) and please indicate associated actual production of VCM and report under "remarks" when installed production capacities have changed.

*** Please indicate the associated volumetric flow-rate.

b. Discharges to water

Substances	Specific load ⁸ In reporting year ^{9*} g/tonne of s-PVC produced	Alternatively: Total load in reporting year kg/year (comparison with the base year) **	Alternatively: Concentration mg/l ***
VCM ^{a), b)}			

* Please indicate under "remarks" how specific loads were calculated.

** If reporting total loads, please add a baseline load for (2001) and please indicate associated actual production of VCM and report under "remarks" when installed production capacities have changed.

*** Please indicate the associated volumetric flow-rate.

^{a)} Please state correlation when VCM data are based on AOX or EOX measurements.

^{b)} After effluent stripper, before secondary treatment.

c. Remarks: (i.e. explanation if change in production capacity in the country appeared, method to calculate specific loads)

⁶ Wherever possible this parameter should be reported

⁷ The year for which data are to be reported in 2008/2009 is 2007.

⁸ Wherever possible this parameter should be reported

⁹ The year for which data are to be reported in 2008/2009 is 2007.

3. Emulsion-PVC Plants (e-PVC) covered by the OSPAR Recommendations 99/1 and 2000/3

Please indicate number and capacity of plants: _____

Total capacity (tonnes e-PVC/year): _____

a. Emissions to air:

Substances	Specific load ^{10 a)} In reporting year ^{11*} g/tonne of e-PVC produced	Alternatively: Total load in reporting year ^{a)} kg/year (comparison with the base year) **	Alternatively: Concentration ^{a)} mg/m ³ ***
VCM (point sources)			
VCM (arising from PVC waste – all environmental routes)			

* Please indicate under “remarks” how specific loads were calculated.

** If reporting total loads, please add a baseline load for (2001) and please indicate associated actual production of VCM and report under “remarks” when installed production capacities have changed.

*** Please indicate the associated volumetric flow-rate and whether fugitive emissions are included.

a) In brackets: (Number of samples)

b. Discharges to water

Substances	Specific load ¹² In reporting year ^{13*} g/tonne of PVC produced	Alternatively: Total load in reporting year kg/year (comparison with the base year) **	Alternatively: Concentration mg/l ***
VCM (producing only e-PVC) ^{a), b)}			
VCM (producing e-PVC and s-PVC at the same site) ^{a), b)}			

* Please indicate under “remarks” how specific loads were calculated.

** If reporting total loads, please add a baseline load for (2001) and please indicate associated actual production of VCM and report under “remarks” when installed production capacities have changed.

*** Please indicate the associated volumetric flow-rate.

a) Please state correlation when VCM data are based on AOX or EOX measurements.

b) After effluent stripper, before secondary treatment.

c. Remarks: (i.e. explanation if change in production capacity in the country appeared, method to calculate specific loads)

¹⁰ Wherever possible this parameter should be reported

¹¹ The year for which data are to be reported in 2008/2009 is 2007.

¹² Wherever possible this parameter should be reported

¹³ The year for which data are to be reported in 2008/2009 is 2007.