



An Ghníomhaireacht um Chaomhnú Comhshaoil

Integrated Pollution Control Licensing

Batneec Guidance Note
For The
Manufacture Or Use Of
Coating Materials

Environmental Protection Agency

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Draft copy



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*This document does not purport to be and should not be
considered a legal interpretation of the provisions and
requirements of the E.P.A. Act, 1992.*

Environmental Protection Agency

Ardcavan, Wexford

Telephone : +353-53-47120 Fax : +353-53-47119

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Batneec Guidance Note For The Manufacture Or Use Of Coating Materials

ISBN 1 899965 49 1
EPA No. LC 22

Price Ir. £5.00

11/97/300

Environmental Protection Agency

ESTABLISHED

The Environmental Protection Act, 1992, was enacted on 26 April, 1992 and under this Act the Agency was established on 26 July, 1992.

FUNCTIONS

The Agency has a wide range of functions, duties and powers under the Act. The main functions of the Agency are the following:

• the licensing and regulation of large/complex industrial and processes with significant polluting potential, on the basis of integrated pollution control (IPC) and the application of best available technologies for this purpose;

• the monitoring of environmental quality, including the establishment of databases to which the public have access, and the publication of periodic reports on the state of the environment;

• advising public authorities in respect of environmental functions and assisting local authorities in the performance of their environmental protection functions;

- the promotion of environmentally sound practices through, for example, the encouragement of the use of environmental audits, the establishment of an eco-labelling scheme, the setting of environmental quality objectives and the issuing of codes of practice on matters affecting the environment;

- the promotion and co-ordination of environmental research;

- the licensing and regulation of all significant waste recovery activities, including landfills and the preparation and updating periodically of a national hazardous waste plan for implementation by other bodies; and

- generally overseeing the performance by local authorities of their statutory environmental protection functions.

STATUS

The Agency is an independent public body. Its sponsor in Government is the Department of the Environment. Independence is assured through the selection procedures for the Director General and Directors and the freedom, as provided in the legislation, to act on its own

initiative. The assignment, under the legislation, of direct responsibility for a wide range of functions underpins this independence. Under the legislation, it is a specific offence to attempt to influence the Agency, or anyone acting on its behalf, in an improper manner.

ORGANISATION

The Agency's headquarters are located in Wexford and it operates five regional inspectorates, located in Dublin, Cork, Kilkenny, Castlebar and Monaghan.

MANAGEMENT

The Agency is managed by a full-time Executive Board consisting of a Director General and four Directors. The Executive Board is appointed by the Government following detailed procedures laid down in the Act.

ADVISORY COMMITTEE

The Agency is assisted by an Advisory Committee of twelve members. The members are appointed by the Minister for the Environment and are selected mainly from those nominated by organisations with an interest in environmental and developmental matters. The Committee has been given a wide range of advisory functions under the Act, both in relation to the Agency and to the Minister.

Acknowledgements

The Environmental Protection Agency would like to acknowledge the Environmental Services Group, Forbairt who prepared the initial draft of this BATNEEC note.

The Agency would also like to take this opportunity to thank the following bodies who were consulted during the drafting of this note:

Advisory Committee, E.P.A.
Bord na Mona
County & City Engineers Association
Construction Industry Federation
Department of Enterprise and Employment
Department of the Environment
Department of the Marine
Irish Business and Employers Confederation
National Furniture Manufactures Association

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1. INTRODUCTION

This Guidance Note is one of a series issued by the Environmental Protection Agency and is designed to provide guidance to those applying for integrated pollution control licences under the EPA Act. It should also be read in conjunction with *Application Guidance Notes*, available under separate cover.

It should be noted at the outset, that noise is not included within the scope of this work and guidance on this parameter has been issued separately.

This Guidance Note comprises six main sections and three appendices. Following this introduction, Section 2 contains a general note on the interpretation of BATNEEC. The industrial activity covered by the terms of this note is given in Section 3. In Section 4, the technologies to control emissions are tabulated and in Section 5 the specific emission limit values (ELVs) are given. The last section contains comments on compliance monitoring requirements. Appendix 1 gives the main sources of emissions, and the principal releases from such sources: Appendix 2 details the principal references used in drawing up this Guidance Note and Appendix 3 gives details of other IPC publications.

All applicants for Integrated Pollution Control licences, in the sector covered by this note, should carefully examine the information laid down in this Guidance Note, and should use this information to assist in the making of a satisfactory application for an Integrated Pollution Control licence to the Agency. It should be clearly understood that achieving the emission limit values does not, by itself, meet the overall requirements in relation to IPC. In addition to meeting such values the applicant will also be required to demonstrate that waste minimisation is a priority objective and to put in place particular abatement measures to reduce overall mass emissions and pollutant load where this is necessary to protect the ambient environment.

The technologies and the associated emission limit values (ELVs) identified in this Guidance Note are, at the time of writing, regarded as representing BATNEEC for a new activities. BATNEEC is not a static quality and will change as technologies, environmental factors and costs alter with the passage of time. The Agency may amend or update the guidance contained in this note should such amendments seem appropriate. The information contained in this Guidance Note is intended to be used only as a tool to assist in determining the BATNEEC for an operation in this sector and should not be taken to be a definitive authority on the BATNEEC for this sector. This Note should not be considered as a legal document.

2. INTERPRETATION OF BATNEEC

BATNEEC means '*the best available technology not entailing excessive costs*'. The technology in question should be **Best** at preventing pollution and **Available** in the sense that it is procurable by the industry concerned. **Technology** itself is taken as the techniques and the use of the techniques, including training and maintenance etc. **NEEC** addresses the balance between environmental benefit and financial expense.

The objective of the Best Available Technology Not Entailing Excessive Costs (BATNEEC) Guidelines is to provide a list of technologies which will be used by the EPA to determine BATNEEC for a scheduled activity. The BATNEEC identified in this Guidance Note is used as a basis for setting emission limit values. It is intended to update these guidelines as required in order to incorporate technological advances as they occur.

In the identification of BATNEEC, emphasis is placed on pollution prevention techniques, including cleaner technologies and waste minimisation, rather than end-of-pipe treatment. Consideration should be given to energy efficient technology and practices.

Technologies identified in the BATNEEC guidelines are considered to be current best practice for the purposes of setting emission limit values. These technologies are representative of a wide range of currently employed technologies appropriate to particular circumstances. However, the guidance issued in this note in respect of the use of any technology, technique or standard does not preclude the use of any other similar technology, technique or standard which may achieve the same emission. The entire range would not necessarily be appropriate in specific cases. The specific choice depends on a wide range of circumstances but the crucial factor is that the selected regime achieves BATNEEC. In applying BATNEEC, Environmental Quality Objectives (EQOs) must be respected where set. Measures such as in-plant changes, raw material substitution, process recycling and improved material handling and storage practices, may also be employed to effect reductions in emissions. As well as providing for the installation of equipment and the operation of procedures for the reduction of possible emissions, BATNEEC will also necessitate the adoption of an on-going programme of environmental management and control, which will focus on continuing improvements aimed at prevention, elimination and/or progressive reduction of emissions.

As described in the EPA Act of 1992, BATNEEC will be used to prevent, eliminate or, where that is not practicable, limit, abate, or reduce an emission from an activity which is listed in the First Schedule to the Act. The use of BATNEEC is construed in the Act to mean the provision and proper maintenance, operation, use and supervision of facilities which are the most suitable for the purposes.

In determining BATNEEC for an activity, regard shall be had to:

- the current state of technical knowledge;
- the requirements of environmental protection;
- the application of measures for these purposes, which do not entail excessive costs, having regard to the risk of significant environmental pollution which, in the opinion of the Agency, exists.

For existing facilities, additional regard shall be had to:

- the nature, extent and effect of the emission concerned;
- the nature and age of the existing facilities connected with the activity and the period during which the facilities are likely to be used or to continue in operation, and
- the costs which would be incurred in improving or replacing these existing facilities in relation to the economic situation of activities of the class concerned.

The technologies and the associated emission limit values (ELVs) identified in this Guidance Note are regarded as representing BATNEEC for a *new* activity. However, it is also generally envisaged that *existing* facilities will progress towards attainment of similar emission limit values, but the specific ELV requirements and associated time frames will be identified on a case by case basis when the licence application is being processed. Furthermore, for *all* facilities, additional and more stringent requirements may be specified on a site-specific basis whenever environmental protection so requires. Hence the BATNEEC guidelines are not the sole basis on which licence emission limit values are to be set, since information from other sources will also be considered, including site-specific environmental and technical data, plant financial data and other relevant information.

3. SECTOR COVERED BY THIS GUIDANCE NOTE

This Guidance Note covers SECTOR 12.2 of the activities specified in the First Schedule to the EPA Act 1992. These are:

12.2 *The manufacture or use of coating materials in processes with a capacity to make or use at least 10 tonnes per year of organic solvents, and powder coating manufacture with a capacity to produce at least 50 tonnes per year.*

Note 1: This note will deal with the *use* of coating materials in processes with a capacity to use at least 10 tonnes per year of organic solvents and with the *manufacture* of coatings, varnishes, inks and adhesives where over 100 tonnes per annum of organic solvent is used. For the *manufacture* of coatings, varnishes, inks and adhesives below 100 tonnes per annum of solvent use and for powder coating *manufacture* reference should be made to the appropriate Guidance Notes for Metals or Chemicals.

Note 2: Organic Solvents means any organic compound having at 293.15K, a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular condition of use, and which is used alone or in combination with other agents, and without undergoing a chemical change, to dissolve raw materials, products or waste materials, or is used as a cleaning agent to dissolve contaminants, or as a dissolver, or as a dispersion medium, or as a viscosity adjuster, or as a surface tension adjuster, or as a plasticiser, or as a preservative.

Note 3: Annual use means the total input of organic solvents into an installation or a process per calendar year, or any other twelve months period, less any solvent recovered on site for re-use. Re-use means use of recovered solvents for any technical or commercial purpose, including use as a fuel when this is demonstrated to the satisfaction of the Agency, but excluding the final disposal of such recovered solvent as waste.

4. CONTROL TECHNOLOGIES

4.1 INTRODUCTION

As explained in Section 2, this Guidance Note identifies BATNEEC but obviously does so in the absence of site-specific information. Accordingly it represents the requirements expected of any new activity covered by the Note, but does not exclude additional requirements which may form part of the granting of a licence for a specific site.

The approach to be used in selecting BATNEEC is based on the following hierarchy:

- Process design / redesign changes to **eliminate** emissions and wastes that might pose environmental problems (e.g. use of powder coating instead of solvent based).
- **Substitution** of materials (e.g. water based coatings instead of solvent based) by environmentally less harmful ones.
- Demonstration of waste **minimisation** by means of process control, inventory control and end-of-pipe technologies, etc.

The existing or possible measures for preventing, reducing and controlling emissions are described in this section. These range from relatively simple containment measures to sophisticated recovery and "end-of-pipe" technologies and include:

- (i) Load minimisation
- (ii) Containment
- (iii) Recovery/recycle
- (iv) Emission reduction
- (v) Waste treatment and disposal

The technical feasibility of the measures listed below has been demonstrated by various sources. Used singly or in combination, the measures represent BATNEEC solutions when implemented in the appropriate circumstances. The circumstances depend on plant scale, materials used, nature of the products made, number of different products produced, etc. A summary of the treatments for various emissions is given at the end of the section.

Note that where hazardous (including asphyxiant) dusts or vapours occur, safety procedures (acceptable to the Health and Safety Authority) should be adopted. In these and any other matters concerning safety, appropriate safe working practices should be adopted and nothing in this note should be construed as advice to the contrary.

4.2 TECHNOLOGIES FOR LOAD MINIMISATION

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints).

- Inventory control.
- Optimisation of water usage.
- Dry equipment cleaning and dry vacuum systems, where feasible (dry sweeping to be avoided).
- Separation of cooling water, storm water and process effluents of different origin in order to permit appropriate treatment options.
- Water based cleaning systems to be selected instead of solvent based systems.
- Where practicable, use of non-nitrogenated pre-treatment chemicals.
- Except where unavoidable, the following shall not be used:
 - (i) Halogenated substances.
 - (ii) Aromatic solvents.
 - (iii) Organic solvents containing compounds classified as Carcinogens, Mutagens, or Toxic to Reproduction under Directive 67/548/EEC (with labels containing the R phrases R45, R46, R49, R60, R61).
 - (iv) Chlorine based oxidising substances.
 - (v) Solvents containing formaldehyde or n-hexane.
- Inplant measures to extend the service life of pre-treatment baths e.g. filtration, oil skimming, etc.
- Use of countercurrent rinsing and suitable techniques to minimise drag-out.
- Spray application to be selected instead of bath immersion where appropriate.
- Shot blasting is preferred to sand blasting.
- Ultrasonic cleaning.
- Substitution of solvent based coatings with powder coatings or, where this is not practicable, with water based coatings.
- Use of organic pigments rather than metal based pigments.
- Use of Chrome III rather than Chrome VI in chromating.
- Use of high solid content coating materials.
- Use of hot melt adhesives.
- Radiation cure (e.g. UV, electron beam) rather than oven cure.
- Optimisation of mixing procedure to minimise VOC emissions (e.g. reduced mixing times, cooling of mixer etc.)
- Oven temperature to be controlled to minimise the emission of organic coating breakdown products.
- Where practicable, spray coatings to be applied using one of the following systems to achieve a transfer efficiency of > 65%.
 - (i) High volume low pressure (HVLP).
 - (ii) Electrostatic application techniques.

4.3 PREVENTION OF EMISSIONS

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints).

- Enclosure of materials (excluding bulk liquids), storage, handling, processing and transfer within a suitable building.
- Bunding of tanks.
- Overground pipelines and transfer lines.
- Overfilling protection on bulk storage tanks.
- Heat recovery to be used where practicable.
- Local extract and abatement systems as appropriate e.g. dryers, coating and pre-treatment areas etc.
- Minimisation of tank filling losses by e.g. vapour return systems.
- Single controlled emission point for all large dedicated plants.
- Check system to avoid mixing incompatible materials.
- Use of closed transfer systems and lidded holding vessels.
- Solvent vapour emissions to be contained by e.g. refrigerated freeboards, covered baths etc.
- The cleaning of plant and equipment to be carried out in a dedicated system with VOC capture and recovery.
- Curing ovens emissions to be suitably contained by e.g. end zone exhaust ventilation or air curtains.
- Flash-off zones and coating application areas to be extracted by local exhaust ventilation.
- Ovens and ductwork should be maintained gas tight if under positive pressure and leakproof if under negative pressure.

4.4 TECHNOLOGIES FOR RECOVERY AND RECYCLING

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints).

- Solvent recovery plant.
- VOC abatement with solvent recovery (e.g. carbon adsorption and regeneration).

4.5 TECHNOLOGIES FOR TREATING EMISSIONS TO AIR

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints).

(Symbols refer to Table 4.1)

- Condensation (T1).
- Filtration (fabric or paper filters normally adequate) (T2).
- Vapour incineration (Thermal, catalytic and regenerative) (T3).
- Wet scrubbers (T4).
- Carbon adsorption (T5).
- Cyclones (T6).
- Biofilters (T7).

4.6 TECHNOLOGIES FOR TREATING WATER EMISSIONS

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints).

(Symbols refer to Table 4.2).

4.6.1 Pre-treatment

- Reduction (F1).

4.6.2 Treatment

- pH Correction/neutralisation (F2).
- Coagulation/flocculation/precipitation (F3).
- Sedimentation/filtration/flotation (F4).
- Centrifugation (F5).

4.6.3 Polishing

- Resin beds (F6).
- Reverse osmosis (F7).

4.7 TECHNOLOGIES FOR THE TREATMENT AND DISPOSAL OF WASTES

(No priority ranking is intended, and the appropriate selection in a particular case will depend on the specifics of the process concerned and on site constraints).

4.7.1 Sludge Treatment

- Gravity thickening.
- Filtration.
- Centrifugation.

4.7.2 Disposal

- Engineered landfill of wastes.
- Incineration. (Incinerator emissions are subject to a separate note).
- Waste encapsulation.
- Reuse in another industry (e.g. as fuel).

Table 4.1 - Summary of Technologies for Treating Emissions to Air
(Symbols refer to section 4.5)

Emission Type	Technology
Particulates	T2, T4, T6
Odours	T1, T3, T4, T5, T7
Acids/Alkalis	T4
VOC's	T1, T3, T5, (T7)

Table 4.2 - Summary of Technologies for Treating Water Emissions
(Symbols refer to section 4.6)

Emission Type	Technology
Acids/Alkalis	F2
Phosphates	F3
Ammonia/Nitrates	-
Suspended Solids	F3, F4, F5
Metals	F1, F3, F6, F7
Oils	F4

5. EMISSION LIMIT VALUES

5.1 REFERENCE CONDITIONS

The reference conditions for concentrations of substances in emissions to air from contained sources are:

Temperature 273K; Pressure 101.3 kPa; no correction for water vapour content.

These units and reference conditions may not be suitable for continuous monitoring methods and may, by agreement with the Agency, be converted, for day to day control purposes, into values more suitable for the available instrumentation.

5.2 INTERPRETATION OF COMPLIANCE

Unless otherwise detailed in the licence, the following interpretation of compliance with limit values should apply:

5.2.1 Emissions to Air

For **continuously monitored** emissions, the following will be required for compliance with measurements based on 60 minute mean values (unless otherwise stated):

- (i) No 60 minute mean measurement shall exceed 1.5 times the emission limit.
- (ii) All 8 hour moving average values shall be less than the emission limit.

Only the periods in which the installations or processes are actually in operation are to be taken into account.

Where **periodic monitoring** is used to check compliance, all samples should meet the consent conditions.

The **mass emission** of solvents should be determined by a mass balance to derive total solvent loss using throughput data and solvent purchase and recovery records. A detailed inventory of solvent purchase should be kept.

Where **odorous materials** are released, lower ELV values may be required in specific cases to prevent odour nuisance.

5.2.2 Emissions to waters

The limit values for discharges to water are based on 24 hour flow proportional composite samples unless otherwise specified.

5.3 EMISSIONS TO AIR

Emission Limit Values representing BATNEEC are given in Tables 5.1 - 5.4 .

Table 5.1 - Emission Limit Values for Emissions to Air for All Sources

(Tables 5.2 - 5.4 also apply as appropriate)

Emission Source	Total Solvent Use or Consumption	Limit Values for Waste Gas Discharges (mg/m ³)
All	Above the threshold (tonnes/annum) given in Tables 5.2 - 5.4	¹ Class A (total): 2 (for mass emissions > 10 g/h of Class A compounds) ² Class B (total): 20 (for mass emissions > 100 g/h of Class B compounds) Particulates (spray painting operations): 3 Other Emissions: See tables 5.2 - 5.4
All	Below the threshold (tonnes/annum) given in Tables 5.2 - 5.4	¹ Class A (total): 2 (for mass emissions > 10 g/h of Class A compounds) ² Class B: As per T.A. Luft 1986 for Organic compounds of Classes I and II. Otherwise include in other emissions. Other Emissions plus Class B compounds: 150 (as C) (for mass emissions > 3 kg/h total) Particulates (spray painting operations): 3

(Achievement of ELV concentrations by the introduction of dilution air is not permitted).

¹ Class A compounds are substances with labels containing the R phrases R45, R46, R49, R60 or R61 as classified under Directive 67/548/EEC (as modified by Directive 93/21/EEC). Examples of these are:

R45	benzene; 1,2-dichloroethane; 2-nitropropane; 1,2-dibromoethane; 1,3-dichloro-2-propanol
R60-61	2-methoxyethanol; 2-ethoxyethanol; 2-methoxyethylacetate; 2-ethoxyethylacetate.

² Class B compounds are chlorinated organic solvents with labels containing the risk phrase R40 as classified under Directive 67/548/EEC (as modified by Directive 93/21/EEC). Examples of these are 1,1,2,2-tetrachloroethane, dichloromethane, tetrachloromethane and tetrachloroethylene.

Table 5.2 - Emission Limit Values for Emissions to Air from Printing Processes
(These values apply in addition to those in Table 5.1 as appropriate)

Emission Source	Solvent Use or Consumption	Limit Values for Waste Gas Discharges (mg/m³)
Heatset web offset	15 - 25 tonnes/annum	Total organics (as C): 150
	>25 tonnes/annum	Total organics (as C): 20
Publication rotogravure	>25 tonnes/annum	Total organics (as C): 100
Other rotogravure, flexography, rotary screen, laminating, varnishing	>15 tonnes/annum	Total organics (as C): 150

(Achievement of ELV concentrations by the introduction of dilution air is not permitted.)

Table 5.3 - Emission Limit Values for Emissions to Air from Vehicle Coating

(These values apply in addition to those in Table 5.1 as appropriate)

Emission Source	Solvent Use or Consumption	Limit Values for Waste Gas Discharges (mg/m³)	Number of vehicles	Total Emission Limit
New cars	>15 tonnes/annum	Total organics (as C): 50	>5000 cars /annum	<70 g/m ² (cars above 6 seats) <45 g/m ² (cars up to 6 seats)
			<5000 cars /annum	<90 g/m ²
New truck cabins	>15 tonnes/annum	Total organics (as C): 50	>5000 cabins/annum	<55 g/m ²
			<5000 cabins/annum	<65 g/m ²
New vans trucks and trailers	>15 tonnes/annum	Total organics (as C): 50	>2500 units/annum	<70 g/m ²
			<2500 units/annum	<90 g/m ²
New buses	>15 tonnes/annum	Total organics (as C): 50	>500 buses/annum	<150 g/m ²
			<500 buses/annum	210 g/m ²
Vehicle coating and refinishing	>10 tonnes/annum	Total organics (as C): 50	-	25% (of solvent input)

(Achievement of ELV concentrations by the introduction of dilution air is not permitted.)

Table 5.4 - Emission Limit Values for Emissions to Air from Other Coating Processes
(These values apply in addition to those in Table 5.1 as appropriate)

Emission Source	Solvent Use or Consumption	Limit Values for Waste Gas Discharges (mg/m³)	Total Emission Limit (as solvent usage)
Coil coating	>25 tonnes/annum	<u>Coating and drying</u> Total organics (as C): 50	-
Leather coating	10-25 tonnes/annum	-	<85g/m ² of total coated surface
	>25 tonnes/annum	-	<75g/m ² of total coated surface
Adhesives coating	>10 tonnes/annum	<u>Coating and drying</u> Total organics (as C): 150 (absorption and reuse) 50 (incineration)	-
Other coating (e.g. textiles, fabric, film & paper)	10 - 15 tonnes/annum	<u>Coating and drying</u> Total organics (as C):150	-
	>15 tonnes/annum	<u>Coating</u> Total organics (as C):100 <u>Drying</u> Total organics (as C):50	-

(Achievement of ELV concentrations by the introduction of dilution air is not permitted.)

Table 5.4 - Continued

(These values apply in addition to those in Table 5.1 as appropriate)

Emission Source	Solvent Use or Consumption	Limit Values for Waste Gas Discharges (mg/m³)
Pharmaceutical finishing	>50 tonnes/annum	Total organics (as C): 150 (reuse) Total organics (as C): 20 (no reuse)
Wood coating	15-25 tonnes/annum >25 tonnes/annum	<u>Coating and drying</u> Total organics (as C): 150 <u>Coating</u> Total organics (as C): 100 <u>Drying</u> Total organics (as C): 50
Manufacture of coatings, varnishes, inks and adhesives	>100 tonnes/annum	Total organics (as C): 150

(Achievement of ELV concentrations by the introduction of dilution air is not permitted.)

5.4 Emissions to Water

Effluent should be minimised by recycling and re-use of materials wherever practicable. The use of lower quality water may be possible for some parts of the process rather than fresh water.

All releases to waters are subject to a licence from the Agency. However any discharges to sewer will require the consent of the sanitary authority. BATNEEC to minimise the release of substances will generally include minimisation at source and either specific treatment of contaminated waste streams to remove particular substances or co-treatment of combined effluent streams or both. The Emission Limit Values for effluent discharges to waters are set out in Table 5.5.

Table 5.5 - Emission Limit Values for Discharges to Water*

Constituent Group or Parameter	Limit Value	Notes
pH	6 - 9	3
BOD	25 mg/l	3
Toxic Units	5	1,3
Total Nitrogen (as N)**	>80% Removal or 15 mg/l	3,4
Total Phosphorus (as P)**	>80% Removal or 2 mg/l	3,4
Ammonia (mg/l as N)	10	3
Fish Tainting	No Tainting	2,3
Oil (mg/l)	20	3
Organohalogens (mg/l as Cl)	0.1 (monthly ave.)	3
Zinc (mg/l)	0.5	3
Chromium VI (mg/l)	0.1	3
Chromium (Total) (mg/l)	0.5	3
E.C. List 1	As per 76/464/EEC and amendments	-

* All values refer to daily averages, except where otherwise stated to the contrary, and except for pH which refers to continuous values. Limits apply to effluent prior to dilution by any uncontaminated streams, e.g. storm water, cooling water, etc.

** Only applicable to waters subject to eutrophication. One or both parameters may be applied depending on the local situation.

Notes for Table 5.5

1. The toxicity of the effluent shall be determined by testing an appropriate aquatic species. The number of Toxicity Units (TU) = 100/96 hr LC50 in percentage vol/vol. so that higher TU values reflect greater levels of toxicity.
2. No substances shall be discharged in a manner which, or at a concentration which, following initial dilution causes tainting of fish or shellfish, interferes with normal patterns of fish migration or which accumulates in sediments or biological tissues to the detriment of fish, wildlife or their predators.
3. Consent conditions for discharge to sewer must be established with the sanitary authority, and different values may apply.
4. Reduction in relation to influent load. Total nitrogen means the sum total of Kjeldahl-nitrogen plus nitrate-nitrogen plus nitrite-nitrogen.

6. COMPLIANCE MONITORING

The methods proposed for monitoring the emissions from these sectors are set out below. Monitoring of organic compounds referred to in 6.1.1 and 6.1.2 below, may, where appropriate, be carried out by correlating the concentration of these compounds with other parameters. It should be noted that for licensing purposes individual compound emissions may need to be quantified in order that an impact analysis can be satisfactorily completed.

6.1 EMISSIONS TO AIR

6.1.1 Continuous monitoring (during the period of operation of the plant process) of total organic carbon will be required for all emissions exceeding 10 kg/h (determined as an 8 hour moving average). Periodic monitoring of total organic carbon will be required where the emissions exceed 1 kg/h. In addition periodic monitoring of individual organic compounds will be required where the sum of Class A compounds emitted exceeds 0.01 kg/h or the sum of Class B compounds exceeds 0.1 kg/h. Where periodic monitoring is required at least three valid measurements shall be taken per twelve month period.

6.1.2 The temperature of ovens should be continuously monitored and either
(i) Results continuously recorded.
or (ii) Fitted with an alarm activating if temperature exceeds design limits.
or (iii) Interlocked to ensure that excessive oven temperatures are prevented.

6.1.3 All installations covered by this guidance note should prepare an annual solvent management plan in accordance with licence requirements.

6.2 WASTE WATER DISCHARGES

6.2.1 Establish existing conditions, prior to start-up, of key emission constituents, and salient flora and fauna.

6.2.2 Daily monitoring of flow, volume and pH. Monitoring of other relevant parameters as deemed by the Agency taking account of the nature, magnitude and variability of the emission, and the reliability of the control technologies.

6.2.3 Monitoring of influent and effluent from the waste water treatment plant to establish an early warning of any difficulties in waste water treatment plant, or unusual loads.

- 6.2.4 The potential for the treated effluent to have tainting or toxic effects should be assessed and if necessary measured by established laboratory techniques.

6.3 SOLID WASTE MONITORING

- 6.3.1 The recording in a register of the types, quantities, date and manner of disposal of all wastes.
- 6.3.2 Leachate testing of sludges and other material as appropriate being sent for landfilling.
- 6.3.3 Annual waste minimisation report showing efforts made to reduce specific consumption together with material balance and fate of all waste materials.

APPENDIX 1

SOURCES AND EMISSIONS

1. INTRODUCTION

In this section, the major sources of emissions to air and water are identified, as are the principal sources of waste from the sector. It should be borne in mind that the identified list of sources is not all encompassing, nor will every plant falling within an individual sector have every one of the emissions which are associated with the sector as a whole.

Emissions are considered under the following headings: fugitive and unscheduled emissions, and specific process emissions. Some of the process emissions may be considered to have little potential environmental significance and these are designated as minor (m). (In specific plants, the designation of emissions as minor will be made on an individual basis during the licensing process).

2. SOURCES OF EMISSION TO AIR FROM (SYMBOLS REFER TO TABLE A1)

2.1 Fugitive and Unscheduled Emissions

- Stripping of volatile compounds from waste water treatment plants (WWTP) resulting in releases to air and/or odour problems.
- Storage tank vents.
- Vapour losses during storage, filling and emptying of bulk solvent tanks and drums (including hose decoupling).
- Leakages from flanges, pumps, seals, valve glands etc.
- Building losses (windows, doors, etc.)
- Workspace ventilation losses.

2.2 Process Emissions

- Pre-treatment (e.g. Degreasing, sanding, shot blasting, cleaning, phosphating, chromating, etc. (S1).
- Coating (S2).
- Dryers (S3).
- Solvent recovery (S3).

3. SOURCES OF EMISSIONS TO WATER FROM (SYMBOLS REFER TO TABLE A2)

3.1 Spills and Diffuse Sources, etc.

- Storage tank leaks
- Pipework leaks.
- Spillages.
- Bunds.
- Leakages from flanges, pumps, seals, valve glands, etc.

3.2 Process Emissions

- Spent pre-treatment liquors (E1).
- Wash waters (E1).
- Boiler blowdown (m).
- Scrubber and abatement system liquors (E2).
- Contaminated water arising from cleaning of plant (E2).
- Laboratory effluent (m).

4. SOURCES OF WASTE (SYMBOLS REFER TO TABLE A3)

- Spent solutions (W1).
- Sludges from WWTP and abatement systems (W2).
- Contaminated drums, equipment, packaging and protective clothing (W3)
- Still bottom residues (W4).
- Dust from abatement plant (W5).
- Spent solvent and coating material (W6).
- Filters (W7).

Table A1 - Summary of Sources and Emissions to Air
(Symbols refer to section 2 of this Appendix)

Source	Emissions
S1	Acids, Alkalis, Particulates
S2	VOC's, Particulates (Paint)
S3	VOC's Odours

Table A2 - Summary of Sources and Emissions to Water
(Symbols refer to section 3 of this Appendix)

Sources	Emissions
E1	Acids, Alkalis, Metals, Phosphates, Suspended Solids, Nitrates, Ammonia, Organic, Oils (m)
E2	Acids, Alkalis, Metals, Oils (m) Organic

Table A3 - Summary of Other Releases
(Symbols refer to section 4 in this Appendix)

Source	Emission
W1	Acids, Alkalis, Metals, Ammonia, Suspended Solids Oils, Nitrates, Phosphates
W2	Metals, Phosphates, Oils, Trace VOC's
W3	Process and Treatment Plant Chemicals
W4	Polymeric residues Oils/Fats/Grease Solvent
W5	Coating Solids (incl. metals)
W6	VOC's Coating Solids (including metals)
W7	Polymers, Coating Solids, VOC's

APPENDIX 2

PRINCIPAL REFERENCES

1. U.K. DEPARTMENT OF THE ENVIRONMENT

- 1.1 Secretary of State's Guidance PG 6/32(92)
(Adhesive Coating Processes)
- 1.2 Secretary of State's Guidance PG 6/15(92)
(Coating in Drum Manufacturing and Reconditioning Process)
- 1.3 Secretary of State's Guidance PG 6/18(92)
(Paper Coating Processes)
- 1.4 Secretary of State's Guidance PG 6/7(91)
(Printing and Coating of Metal Packaging)
- 1.5 Secretary of State's Guidance PG 6/17(92)
(Printing of Flexible Packaging)
- 1.6 Secretary of State's Guidance PG 6/13(91)
(Coil Coating Processes)
- 1.7 Secretary of State's Guidance PG 6/34(92)
(Respraying of Road Vehicles)
- 1.8 Secretary of State's Guidance PG 6/20(92)
(Paint Application in Vehicle Manufacturing)
- 1.9 Secretary of State's Guidance PG 6/16(92)
(Printworks)
- 1.10 Secretary of State's Guidance PG 6/14(91)
(Film Coating Processes)

- 1.11 Secretary of State's Guidance PG 6/33(92)
(Wood Coating Processes)
- 1.12 Secretary of State's Guidance PG 6/35(92)
(Metal and Other Thermal Spraying Processes)
- 1.13 Secretary of State's Guidance PG 6/31(92)
(Powder Coating Processes, including Sheradizing)
- 1.14 Secretary of State's Guidance PG 6/23(92)
(Coating of Metal and Plastic)

2. E.C.

- 2.1 Proposal for a Council Directive (EEC) on the Limitation of the Emissions of Organic Compounds due to the use of Organic Solvents in Certain Processes and Industrial Installations (October 1993/March 1995/March 1996/June 1996).

3. Germany

- 3.1 T.A. Luft (1986)

APPENDIX 3

I.P.C. Licensing Information Published by the Environmental Protection Agency

LC1/94	Integrated Pollution Control Licensing - Guide to Implementation and Enforcement in Ireland	£1.50
LC2/94	Integrated Pollution Control - Summary of Licensing Procedures	No charge
LC3/95	Environmental Protection Agency - Summary of its Structures Powers and Functions	No charge
LC4/94	Integrated Pollution Control (IPC) Licensing Fees	No charge
LC5/94	Environmental Protection Agency Act, 1992 (Noise) Regulations, 1994.	No charge
LC6/95	BATNEEC Guidance Note for the Chemical Sector	£5.00
LC7/95	BATNEEC Guidance Note for the Waste Sector	£5.00
LC8/95	Guidance Note for Noise in Relation to Scheduled Activities	£3.00
LC9/95	Aspects of Licensing Procedures - Objections. Oral Hearing	£1.50
LC10/95	Fire-Water Retention Facilities (Draft) Guidance Note to Industry on the Requirements for Fire-Water Retention Facilities	£3.00
LC11/96	BATNEEC Guidance Note for Board Manufacture	£5.00
LC12/96	BATNEEC Guidance Note for The Production of Cement	£5.00
LC13/96	BATNEEC Guidance Note for The Rendering of Animal By-products	£5.00
LC14/96	BATNEEC Guidance Note for The Extraction of Alumina	£5.00
LC15/96	BATNEEC Guidance Note for The Poultry Production Sector	£5.00

LC16/96	BATNEEC Guidance Note for The Pig Production Sector	£5.00
LC17/96	BATNEEC Guidance Note for The Slaughter of Animals	£5.00
LC18/96	BATNEEC Guidance Note for The Manufacture of Sugar	£5.00
LC19/96	BATNEEC Guidance Note for Electroplating Operations	£5.00
LC20/96	BATNEEC Guidance Note for The Manufacture of Integrated Circuits & Printed Circuit Boards	£5.00
LC21/96	Report on IPC Licensing & Control, 1995	£5.00

*These documents are available from EPA Publications, St. Martin's House, Waterloo Road, Dublin 4.
Telephone: +353-1-667 4474*